Greater Accra Regional Spatial Development Framework – Volume 2
Regional Spatial Development Framework Strategies and Policies Report
J36261
ORIGINAL

June 2017
# Greater Accra Regional Spatial Development Framework – Volume 2
## Regional Spatial Development Framework Strategies and Policies Report

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>1.1 Background (As per RFP)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>1.2 Ghana’s Legal Framework</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>1.3 Three-Tier Planning System in Ghana</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1.4 Purpose of the RSDF</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>1.5 Project Approach</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>1.6 Methodology</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>1.7 This Report</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>1.8 Project Comments</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>The Greater Accra Region in Context</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>2.1 Location</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>2.2 The Study Area</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2.3 History of the Region</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>2.4 Spatial Dynamics of the Region</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>2.5 GAR in terms of the NSDF</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>A Status Quo Overview of the Greater Accra Region</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>3.1 Population and Social Environment</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>3.2 Natural Environment</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>3.3 Economic Environment</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>3.4 Man-made Environment – Regional Built Environment</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>3.5 Man-made Environment – Road Infrastructure and Transportation</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>3.6 Man-made Environment – Engineering Services</td>
<td>80</td>
</tr>
</tbody>
</table>
3.7 Institutional Environment 95

4 Greater Accra Main Findings and Vision 97
4.1 Main Findings 97
4.2 Potential Remedial Mechanisms 99
4.3 Vision 103

5 Formulating the Plan 104

6 Development Models and Spatial Concept 105
6.1 Development Models 105
6.2 Spatial Development Concept 108

7 Greater Accra RSDF 112
7.1 Regional Spatial Development Framework 112
7.2 Rural Spatial Development Component 117
7.3 Urban Spatial Development Component 135
7.4 Spatial Development Guidelines 190
7.5 Institutional Issues 200

8 Implementation Plan 204
8.1 Land Use 205
8.2 Environmental Sector 208
8.3 Economic Environment 212
8.4 Transportation 214
8.5 Engineering Services 218
8.6 Energy 225

9 References 229
9.1 Natural Environment 229
9.2 Engineering Services and Infrastructure 232
9.3 Electrical Infrastructure 235
9.4 Road Infrastructure and Transportation 235
9.5 Town Planning 236
9.6 Population and Social Environment 237
9.7 Economic Environment 237
9.8 Institutional Environment 238

Document Control and Disclaimer 246
## List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Ghana’s Three-Tier Planning System</td>
<td>13</td>
</tr>
<tr>
<td>1.2</td>
<td>Five Planning Environments</td>
<td>14</td>
</tr>
<tr>
<td>1.3</td>
<td>Project Approach</td>
<td>16</td>
</tr>
<tr>
<td>1.4</td>
<td>Project Methodology</td>
<td>17</td>
</tr>
<tr>
<td>1.5</td>
<td>Project Deliverables</td>
<td>17</td>
</tr>
<tr>
<td>2.1</td>
<td>Location of Ghana</td>
<td>19</td>
</tr>
<tr>
<td>2.2</td>
<td>Ghana</td>
<td>19</td>
</tr>
<tr>
<td>2.3</td>
<td>Location of Greater Accra Region</td>
<td>19</td>
</tr>
<tr>
<td>2.4</td>
<td>Study Area / Greater Accra Region</td>
<td>21</td>
</tr>
<tr>
<td>2.5</td>
<td>Landmarks</td>
<td>22</td>
</tr>
<tr>
<td>2.6</td>
<td>Urban Core and Rural East</td>
<td>25</td>
</tr>
<tr>
<td>3.1</td>
<td>The Ghana Educational Structure and Number of Educational Facilities within GAR</td>
<td>31</td>
</tr>
<tr>
<td>3.2</td>
<td>Broad Spatial Structure</td>
<td>46</td>
</tr>
<tr>
<td>3.3</td>
<td>Density Distribution across the GAR</td>
<td>49</td>
</tr>
<tr>
<td>3.4</td>
<td>Urban / Rural Division</td>
<td>52</td>
</tr>
<tr>
<td>3.5</td>
<td>Urban Functionality</td>
<td>53</td>
</tr>
<tr>
<td>3.6</td>
<td>Rural Functionality</td>
<td>55</td>
</tr>
<tr>
<td>3.7</td>
<td>Linkages</td>
<td>57</td>
</tr>
<tr>
<td>3.8</td>
<td>CBD Remains Important</td>
<td>62</td>
</tr>
<tr>
<td>3.9</td>
<td>Peripheral Urban Growth</td>
<td>62</td>
</tr>
<tr>
<td>3.10</td>
<td>Lack of Urban Support Structure</td>
<td>63</td>
</tr>
<tr>
<td>3.11</td>
<td>West-East Pull Factors</td>
<td>63</td>
</tr>
<tr>
<td>3.12</td>
<td>Travel Speed by Road</td>
<td>66</td>
</tr>
<tr>
<td>3.14</td>
<td>Current Railway Network in GAMA</td>
<td>67</td>
</tr>
<tr>
<td>3.15</td>
<td>Railway Rehabilitation and Extension Plan</td>
<td>68</td>
</tr>
<tr>
<td>3.16</td>
<td>Implementation Plan for Railway</td>
<td>69</td>
</tr>
<tr>
<td>3.17</td>
<td>Improvement Strategy in the Public Transport Sector</td>
<td>74</td>
</tr>
<tr>
<td>3.18</td>
<td>Concept for Bus Network</td>
<td>74</td>
</tr>
<tr>
<td>3.19</td>
<td>Arterial Bus Network Plan</td>
<td>75</td>
</tr>
<tr>
<td>3.20</td>
<td>Proposed BRT Plan</td>
<td>75</td>
</tr>
<tr>
<td>3.21</td>
<td>Initial Proposed BRT Plan</td>
<td>76</td>
</tr>
<tr>
<td>3.22</td>
<td>Existing NMT Network</td>
<td>77</td>
</tr>
<tr>
<td>3.23</td>
<td>NMT Network Plan</td>
<td>78</td>
</tr>
</tbody>
</table>
Figure 3.24: 24-Hour Traffic Count Positions ......................................................... 78
Figure 3.25: Adam Clark Water Treatment Works near Weija Reservoir ......................... 80
Figure 3.26: Kpong Water Treatment Works near Volta River .................................... 81
Figure 3.27: Distribution of Sanitation Facilities in GAR ........................................... 85
Figure 3.28: Lavender Hill Sewerage Disposal Site .................................................... 86
Figure 3.29: Korle Lagoon at Korle Gonne and Jamestown ........................................ 86
Figure 3.30: Jamestown Waste Water Treatment Works, Accra .................................. 86
Figure 3.31: Mudor Faecal Treatment Plant ............................................................. 86
Figure 3.32: Waste Hierarchy Pyramid ..................................................................... 88
Figure 3.33: Informal Dump Sites on Open Land, Streams and Stormwater Channels ......... 90
Figure 3.34: Natural Stormwater Channel filled with Solid Waste ............................... 90
Figure 3.35: Odwa Channel choked with Garbage ...................................................... 91
Figure 5.1: Formulating the Plan ............................................................................ 104
Figure 6.1: Model 1 - Business as Usual ..................................................................... 105
Figure 6.2: Model 2 - Edge City .............................................................................. 106
Figure 6.3: Model 3 - Polycentric / Nodal Regional Structure ..................................... 107
Figure 6.4: Spatial Development Concept .................................................................. 110
Figure 7.1: One RSDF Two Components .................................................................. 114
Figure 7.2: Regional Components .......................................................................... 114
Figure 7.3: Sustainability context ............................................................................ 116
Figure 7.4: GAR Primary Investment Opportunities - Rural Component ...................... 121
Figure 7.5: Tourism Cluster .................................................................................... 125
Figure 7.6: Proposed Rural Access Management ...................................................... 132
Figure 7.7: GAR Primary Investment Opportunities – Urban Component .................... 142
Figure 7.8: Visual Impression of a Primary Node ....................................................... 145
Figure 7.9: Beachfront Development Opportunity .................................................... 145
Figure 7.10: Visual Impression of a Secondary Node .................................................. 146
Figure 7.11: Visual Impression of a Tertiary Node ..................................................... 148
Figure 7.12: Development along transport corridors .................................................. 150
Figure 7.13: Development Corridor Concept .............................................................. 151
Figure 7.14: Visual Impression of a Development Corridor ......................................... 151
Figure 7.15: Residential Allocation Zones ............................................................... 156
Figure 7.16: Sharing of Space .................................................................................. 157
Figure 7.17: Clustering of Uses / Multi-purpose Node ................................................. 157
Figure 7.18: Access versus Mobility in Functional Road Hierarchy .............................. 165
Figure 7.19: Class 1 Road: Regional Freeway with Grade Separation Access Only ........ 165
Figure 7.20: Class 1A Road: Metropolitan Express Way with Grade Separated Access Only ........................................ 166
Figure 7.21: Class 2 Road: Major Arterial with at-grade signalised, accesses spaced at 1.5-4.0km .... 166
Figure 7.22: Class 3 Road: Minor arterial with access to major developments, off-street parking only .................................................. 166
Figure 7.23: Commuter Rail Proposals ......................................................................................................................... 173
Figure 7.24: Proposed Trans-ECOWAS Rail Line with Additions ............................................................................. 174
Figure 7.25: Proposed Trans-Ecowas Rail Alignment through GAR ................................................................. 174
Figure 7.26: Proposed BRT Routes ......................................................................................................................... 176
Figure 7.27: Proposed Inland Port ......................................................................................................................... 178
Figure 7.28: Visual Impression of an Inland Port ......................................................................................................... 178
Figure 7.29: Aviation and Road Linkage Proposals ........................................................................................................ 180
Figure 7.30: Accra Compost & Recycling Plant (ACARP) .................................................................................. 185
Figure 7.31: RSDF Electricity Network and Service Areas ..................................................................................... 186
Figure 7.32: Benefits of Densification ....................................................................................................................... 193
Figure 7.33: Density Comparison .............................................................................................................................. 194
Figure 7.34: TOD Nodes Linked by Mass Transport ............................................................................................. 195
Figure 7.35: 360°-Encircling Airport Development ............................................................................................ 198

List of Graphs

Graph 3.1: Urban-rural Population Distribution in GAR .................................................................................. 28
Graph 3.2: 20-Year Population Projection .............................................................................................................. 29
Graph 3.3: Dwelling Types in GAR ...................................................................................................................... 32
Graph 3.4: Employment Industry Profile of GAR .................................................................................................. 39
Graph 3.5: Employment Industry Profile of GAR – Urban Area ........................................................................ 40
Graph 3.6: Employment Industry Profile of GAR – Rural Area ........................................................................... 40
Graph 3.7: Demand/Supply Outlook 2016-2021 as per Ghana Electricity Plan .................................................... 93

List of Plans

Plan 3.1: Population Distribution 2037 (Demacon, 2016) .............................................................................. 29
Plan 3.2: Protected Areas in GAR ...................................................................................................................... 36
Plan 3.3: Vegetation in GAR .............................................................................................................................. 36
Plan 3.4: Hydrology in GAR ............................................................................................................................. 37
Plan 3.5: Built-up Areas from 1991-2017 ............................................................................................................. 47
Plan 3.6: Land Use Map .................................................................................................................................... 47
Plan 3.7: GAMA Land Use Proposals 1991 ....................................................................................................... 51
Plan 3.8: GAR Road Network .......................................................................................................................... 65
List of Tables

Table 2.1: Regions of Ghana................................................................. 20
Table 2.2: Administrative Composition of Greater Accra Region ....................... 21
Table 3.1: Shortage of Public Schools .................................................. 31
Table 3.2: District Densities and Urban / Rural Classification ........................ 48
Table 3.3: Implementation Plan for Railway .......................................... 68
Table 3.4: Strategy for Improving NMT in Ghana .................................... 77
Table 3.5: Truck Traffic ....................................................................... 79
Table 3.6: GWCL Water Supply Network Capacity: GAMA .......................... 81
Table 3.7: Estimated Growth in Water Demand - GAMA .............................. 83
Table 3.8: Estimated Shortage in Potable Water - GAMA ............................. 84
Table 3.9: Ghana – Telecommunication Services Providers ........................... 91
Table 4.1: Main Findings ...................................................................... 97
Table 4.2: Potential Remedial Mechanisms ............................................... 99
Table 6.1: Evaluation Matrix for Regional Development Models ..................... 107
Table 7.1: Urban / Rural Population Divide............................................... 113
Table 7.2: Description of the Environmental Criteria .................................... 118
Table 7.3: Land Use Allocation per Rural Settlement Category ....................... 126
Table 7.4: Rural Social and Retail Requirements ....................................... 127
Table 7.5: Functional Description per Class of Road (Rural) ......................... 128
Table 7.6: Land Use Allocation .............................................................. 143
Table 7.7: Spatial Guidelines for Educational Facilities ............................... 159
Table 7.8: Spatial Guidelines for Health Facilities ..................................... 161
Table 7.9: Urban Social and Retail Requirements ...................................... 162

Plan 3.9: Water Supply Zones Map........................................................... 81
Plan 3.10: Flood Prone Areas and Types of Floods in GAR ............................. 91
Plan 7.1: Rural Component of the Regional Spatial Development Framework .... 117
Plan 7.2: GAR Spatial Development Framework ....................................... 128
Plan 7.3: Fishing Ports ........................................................................... 133
Plan 7.4: Urban Component of the RSDF ............................................... 135
Plan 7.5: Road Network Proposals ......................................................... 164
Plan 7.6: Strategic Public Transport Network ........................................... 164
Plan 7.7: Metropolitan Expressway Alternative 1 ....................................... 171
Plan 7.8: Metropolitan Expressway Alternative 2 ....................................... 171
Table 7.10: Functional Description per Class of Road (Urban)................................. 167
Table 7.11: Implementation Plan for Railway ................................................................. 172
Table 7.12: Options to augment potable water supply with risks .................................. 182
Table 7.13: RSDF Demand Projections – 2037 Envisaged Land Uses ......................... 187
Table 7.14: RSDF Demand Projections - Residential Sector Split ............................... 187
Table 7.15: RSDF Demand Projections - Non-Residential Sector Split ......................... 188
Table 7.16: RSDF Demand Projections - GAR Totals ..................................................... 188
Table 7.17: RSDF Demand Projections - Year-on-Year GAR Projections for Energy Demand (ECG vs RSDF) ................................................................. 188
Table 7.18: RSDF Demand Projections - Demand Growth Rates (ECG vs RSDF) .......... 189
Table 7.19: Application of the growth management tools in the GAR ............................. 190
Table 7.20: TOD Guidelines ............................................................................................ 196
Table 7.21: National Urban Policy – Action Areas ......................................................... 202
Table 8.1: Land Use Implementation Projects ................................................................. 205
Table 8.2: Environmental Implementation Projects ....................................................... 208
Table 8.3: Economic Implementation Projects .............................................................. 212
Table 8.4: Transportation Implementation Projects ....................................................... 214
Table 8.5: Water Services Implementation Projects ....................................................... 218
Table 8.6: Sanitation Services Implementation Projects ................................................. 220
Table 8.7: Stormwater Services Implementation Projects ............................................. 221
Table 8.8: Solid Waste Services Implementation Projects ............................................. 222
Table 8.9: Telecommunication Services Implementation Projects ............................. 224
Table 8.10: Energy Implementation Projects ................................................................. 225

Appendices

Appendix A ......................................................................................................................... 239
Appendix B ......................................................................................................................... 240
Appendix C ......................................................................................................................... 241
Appendix D ......................................................................................................................... 242
Appendix E ......................................................................................................................... 243
Appendix F ......................................................................................................................... 244
Appendix G ......................................................................................................................... 245
Revision Status

<table>
<thead>
<tr>
<th>Rev No.</th>
<th>Issue Date</th>
<th># Pages</th>
<th>Revision Description</th>
<th>Prepared By</th>
<th>Reviewed By</th>
<th>Approved By</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distribution List

Copies to:

Copy

Copy

Abbreviations / Acronyms / Definitions

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACARP</td>
<td>Accra Compost &amp; Recycling Plant</td>
</tr>
<tr>
<td>ACE</td>
<td>Africa Coast to Europe</td>
</tr>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>AMA</td>
<td>Accra Metropolitan Area</td>
</tr>
<tr>
<td>ASHMA</td>
<td>Ashaiman Municipal Assembly</td>
</tr>
<tr>
<td>ASIP</td>
<td>Accra Sewerage Improvement Project</td>
</tr>
<tr>
<td>AWDA</td>
<td>Ada West District Assembly</td>
</tr>
<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
</tr>
<tr>
<td>BSP</td>
<td>Buk Supply Point</td>
</tr>
<tr>
<td>CaCl₂</td>
<td>Calcium Chloride</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>CCAC</td>
<td>Climate and Clean Air Coalition</td>
</tr>
<tr>
<td>CEB</td>
<td>Communauté Electrique du Bénin</td>
</tr>
<tr>
<td>CWSA</td>
<td>Community Water &amp; Sanitation Agency</td>
</tr>
<tr>
<td>DA</td>
<td>District Assembly</td>
</tr>
<tr>
<td>DFATD</td>
<td>Department of Foreign Affairs Trade and Development-Canada</td>
</tr>
<tr>
<td>DFR</td>
<td>Department of Feeder Roads</td>
</tr>
<tr>
<td>DMTDP</td>
<td>District Medium Term Development Plan</td>
</tr>
<tr>
<td>DMU</td>
<td>Diesel Multiple Units</td>
</tr>
<tr>
<td>du/ha</td>
<td>dwelling units per hectare</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>DUR</td>
<td>Department of Urban Roads</td>
</tr>
<tr>
<td>EC</td>
<td>Energy Commission</td>
</tr>
<tr>
<td>ECF</td>
<td>Extended Credit Facility</td>
</tr>
<tr>
<td>ECG</td>
<td>Electricity Company of Ghana</td>
</tr>
<tr>
<td>ECOWAS</td>
<td>Economic Community of West African States</td>
</tr>
<tr>
<td>EF</td>
<td>Energy Foundation</td>
</tr>
<tr>
<td>EMDAT</td>
<td>Emergency Events Database</td>
</tr>
<tr>
<td>ENSO</td>
<td>El Nino Southern Oscillation</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>GACL</td>
<td>Ghana Airports Company Limited</td>
</tr>
<tr>
<td>GAMTA</td>
<td>Greater Accra Metropolitan Area</td>
</tr>
<tr>
<td>GAR</td>
<td>Greater Accra Region</td>
</tr>
<tr>
<td>GARSDF</td>
<td>Greater Accra Region Spatial Development Framework</td>
</tr>
<tr>
<td>GCAA</td>
<td>Ghana Civil Aviation Authority</td>
</tr>
<tr>
<td>GCMA</td>
<td>Ga Central Municipal Assembly</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GEMA</td>
<td>GA East Municipal Assembly</td>
</tr>
<tr>
<td>GHA</td>
<td>Ghana Highways</td>
</tr>
<tr>
<td>GHC</td>
<td>Ghana Cedi</td>
</tr>
<tr>
<td>GIBB</td>
<td>GIBB PTY (Ltd)</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GLSS</td>
<td>Ghana Living Standard Survey</td>
</tr>
<tr>
<td>GNWP</td>
<td>Ghana Netherlands Water Programme</td>
</tr>
<tr>
<td>GoG</td>
<td>Government of Ghana</td>
</tr>
<tr>
<td>GPHA</td>
<td>Ghana Ports and Harbours Authority</td>
</tr>
<tr>
<td>GPRTU</td>
<td>Ghana Private Road Transport Union</td>
</tr>
<tr>
<td>GRC</td>
<td>Ghana Railway Company Limited</td>
</tr>
<tr>
<td>GRIDCO</td>
<td>Ghana Grid Company Limited</td>
</tr>
<tr>
<td>GRTCC</td>
<td>Ghana Road Transport Coordinating Council</td>
</tr>
<tr>
<td>GSGDA</td>
<td>Ghana Shared Growth and Development Agenda</td>
</tr>
<tr>
<td>GSIF</td>
<td>Ghana Strategic Investment Framework</td>
</tr>
<tr>
<td>GWCL</td>
<td>Ghana Water Company Limited</td>
</tr>
<tr>
<td>GWh</td>
<td>Gigawatt hour</td>
</tr>
<tr>
<td>GWMA</td>
<td>GA West Municipal Assembly</td>
</tr>
<tr>
<td>GWSA</td>
<td>Community Water &amp; Sanitation Agency</td>
</tr>
<tr>
<td>ha</td>
<td>Hectares</td>
</tr>
<tr>
<td>HDS</td>
<td>Hydrological Services Department</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>HFO</td>
<td>Heavy Fuel Oil</td>
</tr>
<tr>
<td>HIPC</td>
<td>Heavily Indebted Poor Country</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>IPPs</td>
<td>Independent Power Producers</td>
</tr>
<tr>
<td>ITCZ</td>
<td>Inter-Tropical Convergence Zone</td>
</tr>
<tr>
<td>KIA</td>
<td>Kotoka International Airport</td>
</tr>
<tr>
<td>LAP</td>
<td>Land Administration Project</td>
</tr>
<tr>
<td>LCO</td>
<td>Light Crude Oil</td>
</tr>
<tr>
<td>LUPMP</td>
<td>Land Use Planning and Management Project</td>
</tr>
<tr>
<td>LUSPA</td>
<td>Land Use and Spatial Planning Act / Agency</td>
</tr>
<tr>
<td>MA</td>
<td>Municipal Assembly</td>
</tr>
<tr>
<td>MAB</td>
<td>Man and the Biosphere</td>
</tr>
<tr>
<td>MgCl₂</td>
<td>Magnesium Chloride</td>
</tr>
<tr>
<td>MLGRD</td>
<td>Ministry of Local Government and Rural Development</td>
</tr>
<tr>
<td>MMDA</td>
<td>Metropolitan, Municipal and District Authorities</td>
</tr>
<tr>
<td>MMT</td>
<td>Metro Mass Transit Limited</td>
</tr>
<tr>
<td>MOFA</td>
<td>Ministry of Food and Agriculture</td>
</tr>
<tr>
<td>MRH</td>
<td>Ministry of Roads and Highways</td>
</tr>
<tr>
<td>MTDP</td>
<td>Medium-Term National Development Plan</td>
</tr>
<tr>
<td>MTT</td>
<td>Medium Term Development Plan</td>
</tr>
<tr>
<td>MVA</td>
<td>Mega Volt Amp</td>
</tr>
<tr>
<td>MW</td>
<td>Mega Watts</td>
</tr>
<tr>
<td>MWRWH</td>
<td>Ministry of Water resources, Works and Housing</td>
</tr>
<tr>
<td>NaCl</td>
<td>Sodium Chloride</td>
</tr>
<tr>
<td>NCCP</td>
<td>National Climate Change Policy</td>
</tr>
<tr>
<td>NDPC</td>
<td>National Development Planning Commission</td>
</tr>
<tr>
<td>NEDCo</td>
<td>Northern Electricity Distribution Company</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
</tr>
<tr>
<td>NIP</td>
<td>National Infrastructure Plan (2013)</td>
</tr>
<tr>
<td>NMT</td>
<td>Non-Motorised Transport</td>
</tr>
<tr>
<td>NSDF</td>
<td>National Spatial Development Framework, 2015-2035</td>
</tr>
<tr>
<td>OSA</td>
<td>Omnibuses Service Authority</td>
</tr>
<tr>
<td>p/du</td>
<td>people per dwelling unit</td>
</tr>
<tr>
<td>p/ha</td>
<td>people per hectare</td>
</tr>
<tr>
<td>PPP</td>
<td>Private Public Partnership</td>
</tr>
<tr>
<td>PROTOA</td>
<td>Progressive Transport Owners Association</td>
</tr>
<tr>
<td>PV plant</td>
<td>Photovoltaic plant</td>
</tr>
<tr>
<td>PWC</td>
<td>Price Waterhouse Coopers</td>
</tr>
<tr>
<td>QE</td>
<td>Quantitative Easing</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposals</td>
</tr>
<tr>
<td>RSDF</td>
<td>Regional Spatial Development Framework</td>
</tr>
</tbody>
</table>
Acknowledgements

GIBB Engineering and Science wishes to thank the Town and Country Planning Department for their assistance and kind cooperation in completing the RSDF with specific reference to Mr. L. Dakurah, Mr. C. Owusu-Sekyere and Director D. Tettey. Furthermore, the contributions by and assistance from Mr. Benedict Arkhurst, Mr Baba Yakubu Mahama and Me Linda Amofa were invaluable. We further thank the following departments, directorates and officials for their valued contribution, time, energy and views:

Regional Coordinating Director
Regional Economic Planning Officer
Regional Directorate of Health
Regional Directorate of Education
Regional Directorate of Agriculture
Regional Statistical Officer
MLGRD Representative
MESTI Representative
National TCPD Director
NDPC
Head Office TCPD
Regional TCPD
District TCPD Directors
District Development Planning Officers
PCU/LAP
NDPC Regional Representative
Electricity Company of Ghana (Accra West & Accra East)
Regional Head, Environmental Protection Agency
Regional Head, Department of Urban Roads
Regional Head, Department of Feeder Roads
Regional Head, Ghana Highways Authority
Regional Head, Water Resources Commission
Regional Head, Ghana National Fire Service
Regional Head, Forestry Commission
Ghana Water Company
Ghana Institute of Planners
Regional Head, NADMO
Hydrological Services Department
Regional Lands Officer – Lands Commission
Regional House of Chiefs
GIBB Consultants
Ministry of Energy Representative
Ministry of Transport Representative
Ministry of Trade and Industry Representative
Ministry of Water Resources, Works and Housing Representative
Rep. Chamber of Telecoms
Ghana Tourism Authority
1 Introduction

1.1 Background (As per RFP)

The RSDF finds its origin in what is known as LAP-2. LAP-1 also known as Land Administration Project 1 was successfully completed some years ago and has now been superseded by LAP-2, which is a second series of projects to be undertaken by the Government. The Land Use Planning and Management Project (LUPMP), a sub-component of LAP-2, is presently being implemented by the Town and Country Planning Department (TCPD) and it comprises various activities spread across four town planning components. The most prominent of these activities entails the “preparation of improved maps and spatial data for land administration” which includes the preparation of Regional Spatial Development Frameworks for some selected regions in Ghana. Since Accra is the capital City of Ghana it only makes sense that an RSDF must be prepared for the Greater Accra Region (GAR).

Integrated planning across the GAR remains a challenge and has led to massive duplications, conflicts, overlaps and waste. As per the Request for Proposals (RFP), in the absence of a mechanism to guide the location of facilities and services, invisible hands have determined their location in a laissez faire manner and caused great distortions in the hierarchy and functioning of settlements. The unguided exercise of District Assemblies’ power as planning authorities coupled with the absence of a clear mandate for plan preparation at the regional level has further heightened coordination challenges and caused a disconnect among otherwise complementary development interventions in the region. The absence of a clear and directive RSDF therefore has a profound impact on the prevailing spatial form.

Hence, funds were sourced to compile the RSDF which would guide development and direct public and private investment.

1.2 Ghana’s Legal Framework

In Ghana the National Development Planning (System) Act 1994, Act 480 as well as the Land Use and Spatial Planning Act 2016, Act 925 provide for integrated and joint district development planning. In terms of these the RSDF finds legal standing, indicating that it is not only a physical necessity but also a legal requirement.

The Land Use and Spatial Planning Act 2016, Act 925 in Section 53 provides that an RSDF shall have as its key object the judicious use of land and a supportive spatial strategy for exploiting unique regional prospects for increasing regional and national prosperity. Evidently, the focus of the RSDF is to formulate development proposals that will advance and benefit the region, promote growth and development and achieve regional success to benefit the national economy. Moreover an RSDF must provide planning directives for a 20 year period.

Furthermore, in terms of the Manual for the Preparation of Spatial Plans, 2011 a Spatial Development Framework (SDF) should consist of the following:
- An overall discussion of the population growth and distribution, the human settlements system and the location of various land use activities within the country, region and district.

- Where there was already an SDF, an evaluation of the effectiveness of the Framework during the previous planning period.

- A description and analysis of dominant development trends, which drive or influence spatial development.

- The current policy and planning responses covering socio-economic development and its spatial aspect.

- A clear vision and description of the spatial development goals and guidelines for the Nation, Region or District in accordance with the National and Regional or District development policies and SDFs.

- An analysis of the current challenges in population growth, human settlements and land use, and the identification of visions, goals and guidelines for the desired future. And a critical translation of these into policies, priorities and proposals for the key spatial development concerns which are:
  - Identification, conservation and utilisation of resources;
  - Areas with pronounced resources for agriculture and industry;
  - Location of economic development potential for employment;
  - Scale and location of housing needs;
  - Location of infrastructure and services;
  - Sustainable land use strategies with environmental protection; and
  - Institutional framework for ensuring effective spatial development.

- A map or key diagram which illustrates the general content of the spatial strategy and shows the physical extent of proposals, but does not identify specific site boundaries.

- A proposal for how the spatial strategy will be implemented with proposals for additional analysis, negotiations with other authorities, concrete steps to be taken, management, programme and identification of investments in new areas, which are to be transferred to the Medium Term Development Plans (MTDPs).

- An identification of clear targets for monitoring of the planning process and for periodic evaluation of the SDF’s implementation. The impacts of the SDF will be evaluated together with the MTDP.

While the above guidelines define a high level of detail, the RSDF for GAR is sure to meet these requirements and more.

### 1.3 Three-Tier Planning System in Ghana

Planning in Ghana occurs at three primary levels. An extract from the *Manual for the Preparation of Spatial Plans, 2011* shows where the RSDF fits into the system of planning and so indirectly defines the level of detail it should analyse and proposals it should present.
Figure 1.1: Ghana’s Three-Tier Planning System

The RSDF is a high-level overarching plan with the clear intention to provide spatial directives for development. The RSDF will not and cannot provide precinct-level detail, instead it must focus on the regional level to ultimately provide a strategic spatial document that provides critical drivers for the way forward for the entire region.

1.4 Purpose of the RSDF

The reasons for compiling a RSDF are many and in essence are summarised as follows. The RSDF’s purpose is to:

- Undertake a regional-level status quo analysis / baseline assessment with the express purpose of gaining an understanding of the study area. This understanding entails knowing the major developmental problems, determining development opportunities,
learning about the driving forces and how sectors interrelate, and defining the major concerns and the region’s strengths.

- Formulate a clear development vision for the region which should act as a guide for all development and be a directive in determining if any development or actions are beneficial or harming to the region.
- Identify strategic factors that would make a difference in directing the growth and development of the region.
- Prepare a spatial plan which would broadly allocate land uses to specific areas so as to inform development decisions and direct investment projects.
- Avail an implementation plan, informed by the spatial plan, prioritising development elements and areas for the next five years.

The RSDF is a collective effort involving many disciplines to provide an integrated, functional, useable and implementable plan that will deal with the problem areas and build on the strengths and opportunities that have been identified.

### 1.5 Project Approach

An integrated and holistic approach formed the basis of the project. This means an all-encompassing assessment was undertaken to gain a comprehensive understanding of the study area, its functioning, role and future. To this end an integrated and diverse team of specialists was assembled to provide the necessary inputs into the process.

The analysis was conducted in terms of the five pillars of planning and development, namely:

- Natural environment;
- Built environment;
- Social environment;
- Economic environment; and
- Institutional environment.

Where the natural environment is concerned, the research looked into elements such as the rivers, geology, agriculture, topography, protected areas, sensitive areas, etc. and where the built environment is concerned, the analysis looked into all engineering infrastructure and services, settlement patterns,

![Figure 1.2: Five Planning Environments](image-url)
transportation, land use arrangements, urban form, etc. The social environment assessed all issues related to people including demographics, economic conditions and social services. The economic environment reviewed the economic status quo looking into economic sectors, growth areas, areas of concern and areas of economic potential. Finally the institutional environment considered the administrative framework which exists and within which the RSDF will operate. This manner of research provided a desirable comprehensive outcome.

The professional team analysed and defined the development principles and guidelines applicable to development in Ghana and applied these principles:

- **Concentration** – of urban development to achieve sustainable development and growth of cities ensuring more effective use of underutilised urban land and more effective use of infrastructure and services. This, of course, will need to happen within the context of sustained decentralisation as is identified as a driver of transformation in the Long Term National Guidelines for Ghana.

- **Conservation** – of arable agricultural land to ensure food security and protection of natural and tourism resources such as wetlands, the ocean, etc.

- **Good linkage** – regionally, between urban areas via road, rail, etc. as well as internationally through airports and harbours to strengthen the economy and facilitate the movement of people, goods and services.

- **Sustainability** – the primary and overarching principle that will inform the development vision and all development proposals. The core notion would be to attain a balance between the sectors that drive development, i.e. the economy, the environment, people, their needs, and growth, to devise economically viable development proposals.

The review was also issue-based whereby critical issues, both positive and negative for the above five environments were identified and adjusted/amended to suite present day and future requirements. This resulted in an integrated, structured and focused approach to deal with the critical issues.

A spatial concept was generated depicting the core / critical development factors that should direct the future growth of the region. An effort was made to present succinct proposals, i.e. rather a few critical factors and proposals than an unending list of tasks, projects, priorities and actions that are cumbersome and difficult to attain.

The following figure illustrates the approach from which follows the proposed methodology.
1.6 Methodology

A systematic project methodology has been adopted to comprehensively research the area and prepare astute proposals. The process is broadly shown in the following figure, which also corresponds to the figure above.

The project methodology commenced with a fully-fledged and multi-sectoral analysis of the entire study area covering five pillars of planning (as above). With the facts in hand conclusions were drawn in the form of findings and critical factors.

A vision and development concept were formulated as the key drivers to shape the framework. The development concept is a broad land use plan which visually depicts the vision and is the input for the spatial development framework as it informs the various sectors of their development requirements.

With the concept in hand the various planning environments / sectors prepared their development proposals, which in unison formed the spatial development framework, which comprises a series of plans supported by relevant and advisory technical proposals.
The outflow thereof is an implementation plan for a five year timeframe listing and detailing the key development projects that should be addressed to further the RSDF.

![Diagram showing project methodology]

**Figure 1.4: Project Methodology**

### 1.7 This Report

This report is referred to as the **RSDF Strategies and Policies Report**. It is a stepping stone toward the Final RSDF and Implementation Plan. Visually the position of the Draft RSDF Report is shown below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed</td>
<td></td>
<td>In Process</td>
<td>To follow</td>
</tr>
</tbody>
</table>

![Diagram showing project deliverables]

**Figure 1.5: Project Deliverables**

Broadly the Draft RSDF Report comprises a summary of the status qua analysis (as fully contained in Volume 1 of the GAR RSDF), the main findings, vision, possible development models and the proposed RSDF itself.
1.8 Project Comments

The status quo analysis is exclusively based on information available at the time of the project. The project did not make provision for primary information generation. For completeness all reports received from the government of Ghana were reviewed and extensive interviews and meetings were held with relevant departments and officials.

The purpose of this report is to prepare a REGIONAL spatial development framework for an area 4 354km$^2$ in extent. Since it has a regional perspective its focus must be retained at a regional level. Therefore to avoid entrapment in local level detail, the project team endeavoured to conduct the analysis at a regional level only. The focus of the status quo report is to determine how the area functions, what its constraints are and what the issues are that need to be addressed to ensure that this rapidly growing region can cope with the growth, and provide an improved future.

The study in general has endeavoured to identify the most critical spatial issues around which the Spatial Development Framework was prepared. Its focus is to ensure that a sustainable framework is produced for the Greater Accra Region.

Mapping is in the process of being refined and is continuously scrutinised as information feeds into the process.
2 The Greater Accra Region in Context

2.1 Location

The Republic of Ghana is situated on the West Coast of Africa on the Gulf of Guinea which forms part of the Atlantic Ocean. Spanning an area of 238,535 km$^2$ and stretching 560km along the Gulf of Guinea, Ghana is bordered by Ivory Coast in the west, Burkina Faso in the north and Togo in the east. The word Ghana means "Warrior King" in the Soninke language and is likely a derivative from the word "Guinea" which was used to refer to the West African coast now known as in Gulf of Guinea.

Ghana is located only a few degrees north of the Equator, therefore giving it a warm climate. The country used to be covered by tropical forests but significant population growth has led to deforestation and urbanisation. In the south are many natural resources making it a prime location for mining and harvesting of timber. Ghana encompasses plains, waterfalls, low hills, rivers, Lake Volta (the world's largest artificial lake), Dodi Island and Bobowasi Island on the south Atlantic Ocean coast of Ghana.

The study area is situated on the southern coastline of Ghana and is known as the Greater Accra Region (GAR).

All of Ghana is divided into ten regions and they represent the first level of sub-national government administration. The regions as they exist today were officially established in 1987. GAR is one of these regions and is situated between the Central, Eastern and Volta Regions as shown in the adjoining figure. Housing the capital city of Ghana (Accra) and the country’s most prominent seaport (Tema) would suggest that GAR is an important international gateway.

The table below provides an indication of proportional divide amongst the various regions. The physical extent

---

F:\Final Submission June 2017\02. Vol 2 RSDF Strategies Policy\Vol 2_RSDF Strategies Policy Rep_20170620a (2).docx
and population size provides a quick view of the nature of the area.

Table 2.1: Regions of Ghana

<table>
<thead>
<tr>
<th>Region</th>
<th>Capital</th>
<th>Area (km²)</th>
<th>Population (2012/2013)* (Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashanti</td>
<td>Kumasi</td>
<td>24 889</td>
<td>5.2</td>
</tr>
<tr>
<td>Brong-Ahafo</td>
<td>Sunyani</td>
<td>39 557</td>
<td>2.6</td>
</tr>
<tr>
<td>Greater Accra</td>
<td>Accra</td>
<td>4 354</td>
<td>4.3</td>
</tr>
<tr>
<td>Central</td>
<td>Cape Coast</td>
<td>9 826</td>
<td>2.3</td>
</tr>
<tr>
<td>Eastern</td>
<td>Koforidua</td>
<td>19 323</td>
<td>2.7</td>
</tr>
<tr>
<td>Northern</td>
<td>Tamale</td>
<td>70 384</td>
<td>2.6</td>
</tr>
<tr>
<td>Western</td>
<td>Sekondi-Takoradi</td>
<td>23 921</td>
<td>2.4</td>
</tr>
<tr>
<td>Upper East</td>
<td>Bolgatanga</td>
<td>8 842</td>
<td>1.1</td>
</tr>
<tr>
<td>Upper West</td>
<td>Wa</td>
<td>18 476</td>
<td>0.8</td>
</tr>
<tr>
<td>Volta</td>
<td>Ho</td>
<td>20 570</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Ghana</strong></td>
<td></td>
<td><strong>26.3</strong></td>
<td></td>
</tr>
</tbody>
</table>

* This is a projected estimated figure from 2012/2013 GLSS 6

Source: GLSS, Round 6, 2014.

It evidences that GAR is by far the smallest region covering a mere 4 354 km² yet as projected in 2012/2013 was the second most populated region, then accommodating over 4 million people. In terms of size GAR is 4.5 times smaller than Upper West Region which by comparison has a mere 800,000 people. GAR has a notable population density of approximately 1,000 people per square kilometre, which internationally compares to cities such as Calgary (Canada), Nice (France), San Antonio (USA) and Vereeniging (SA).

2.2 The Study Area

The study area is all of GAR. It covers approximately 4 354 km² which is but 1.4% of the total land area of the country. While small, the area and its national role should not be underestimated. The fact that it houses the capital city and harbours the seat of government confirms its importance.

The study area, i.e. GAR, comprises 16 administrative zones. These are listed in the table below while the figure following contains the plan for the study area.
Table 2.2: Administrative Composition of Greater Accra Region

<table>
<thead>
<tr>
<th>District</th>
<th>Capital</th>
<th>Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accra Metropolitan</td>
<td>Accra</td>
<td>137</td>
</tr>
<tr>
<td>Tema Metropolitan</td>
<td>Tema</td>
<td>121</td>
</tr>
<tr>
<td>Adenta Municipal</td>
<td>Adenta</td>
<td>140</td>
</tr>
<tr>
<td>Ga East Municipal</td>
<td>Abokobi</td>
<td>96</td>
</tr>
<tr>
<td>Ga West Municipal</td>
<td>Amasaman</td>
<td>405</td>
</tr>
<tr>
<td>Ga South Municipal</td>
<td>Weija</td>
<td>502</td>
</tr>
<tr>
<td>Ga Central Municipal</td>
<td>Sowutuom</td>
<td>103</td>
</tr>
<tr>
<td>Ashiaman Municipal</td>
<td>Ashiaman</td>
<td>45</td>
</tr>
<tr>
<td>Ledzokuku-Krowor</td>
<td>Teshie-Nungua</td>
<td>50</td>
</tr>
<tr>
<td>Ada East</td>
<td>Ada Foah</td>
<td>291</td>
</tr>
<tr>
<td>Shai Osu Doku</td>
<td>Dodowa</td>
<td>971</td>
</tr>
<tr>
<td>La Dade Kotopon</td>
<td>La (township)</td>
<td>50</td>
</tr>
<tr>
<td>La-Nkwantanang Madina</td>
<td>Madina</td>
<td>75</td>
</tr>
<tr>
<td>Kpone Katamanso</td>
<td>Kapone</td>
<td>294</td>
</tr>
<tr>
<td>Ningo Prampram</td>
<td>Prampram</td>
<td>750</td>
</tr>
<tr>
<td>Ada West</td>
<td>Sege</td>
<td>324</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>4 354</strong></td>
</tr>
</tbody>
</table>

Source: GIS Information 2016 and Five Year Medium Term Plans

Figure 2.4: Study Area / Greater Accra Region
The study area stretches 130 km along the coastline from Langma in the West to Ada-Foah in the East. A part of the eastern boundary is created by Volta River which flows out of Lake Volta towards the Gulf of Guinea.

While having the highest population density the region also has the highest population growth rate, which in part is owing to continued in-migration by people seeking jobs and a better life. The vast majority of residents (83%) are Christians, followed by Muslims (10%) and other religions. The region has a wide variety of education facilities, shopping centres and is served by a network of road and rail infrastructure. Economic activities in the region include the financial and commercial sectors, fishing, manufacturing of processed foods, lumber, plywood, textiles, clothing and chemicals, with tourism emerging as a viable sector.

GAR is Ghana’s most well-endowed region in terms climate and natural resources and has therefore attracted high levels of investment over past centuries. Recent off-shore oil and gas explorations have had some significant consequences. It has resulted in an increased demand for land, raised pressure on already overstretched infrastructure and led to vast in-migration, all of which have had further multiplier effects. Presently, planning and development proposals are haphazard with little comprehensive consideration for urban form and functionality. Consequently, as stated in the Western Region SDF, but which holds true for the entire GAR, this unplanned growth has created an “emerging chaotic development pattern that highlights the absence of spatial policy and adequately resourced governing institutions to co-ordinate and harmonise the ongoing development.”

2.3 History of the Region

Town planning in Accra and the surrounding region truly only started after World War II and it was significantly influenced by British Rule. Some areas were carefully planned and laid out while in others settlements appeared haphazardly creating shanty-town landscapes. The CBD also took shape during this time and it centred on a massive judicial / administrative complex. The then growing economy led to many more commercial buildings rising up around the administrative core.

Thereafter, a new British-influenced urban plan recommended a tight street grid and the preservation of broad open spaces for the design and establishment of many squares, fountains, statues and ornamental pools. However, following post-independence the new Prime Minister Kwame Nkrumah in 1957 created his own plan, shifting focus to creating spaces that would inspire pride and nationalism in his people. Accordingly, he replaced the squares, fountains, statues and ornamental pools with landmarks such as Independence Square, State House, the Organisation of African Unity building and the refurbishment of...
Christianborg Castle. In this plan the initial order and urban form that was sought before independence was somewhat lost as the Nkrumah plan allowed for continued compression of commercial establishments in the CBD and increased migration into Jamestown.

Around this time the small fishing village of Torman, today known as Tema, was transformed to become the new and ultra-modern seaport of Ghana. In 1952 the government acquired 166 km² of land north of the harbour with the intention to build an industrial and residential “new town”. The local villagers were relocated and Tema Township and Harbour were built. The Harbour was officially opened in 1962 and since then the town has grown into Ghana’s industrial hub. Because the town was planned it reveals a carefully constructed road layout featuring landscaping and street lights and boasting modern recreational centres and other social amenities.

On the back of these plans and the promise of employment opportunities large population influx began in the 1960s. The Tema Development Corporation was unable to construct housing and provide other services to meet the needs of the migrants and so Tema Newtown district was overwhelmed by the sudden population growth, and became the poor cousin of Tema Township, receiving none of the latter’s improved housing, geometrically laid roads or social amenities.

Today Tema is locally nicknamed the "Harbour Town" as it is Ghana’s largest seaport. It is a major trading centre, home to an oil refinery and numerous factories, and is linked to Accra via highway and railway. The importance of Tema as a port and industrial hub is reflected by the fact that the Ghana Police Service maintains a special policing region devoted entirely to the city. Tema port handles 80% of the country’s import and export cargo and handles goods in transit for landlocked countries such as Mali, Burkino Faso and Niger.

These towns are important to GAR and their history provides a sense of where the region originated.

2.4 Spatial Dynamics of the Region

Being the administrative and commercial capital of Ghana, Accra (including Accra City Region and GAR) plays an important spatial and developmental role. Accra City Region accounts for 25 percent of the national gross domestic product (GDP) and leads, or is second to lead, in almost all non-primary sectors except education. It is a magnet for investment and a gateway for international trade.

GAR is roughly at the centre of the West African regional economic corridor also known as the West African Mega-region. Being inter-connected by good air, sea, rail and highway links, running from Abidjan to Lagos, GAR is ideally located to become an economic powerhouse. The mega-region spans approximately 600 km across four countries viz. Côte d’Ivoire, Ghana, Benin, Togo and Nigeria and has a fast growing urban population of over 30 million people. Indeed many experts consider this coastal urban corridor to be the engine of West Africa’s regional economy.
By itself, Ghana’s coastal region already meets the criteria of being a mega-region, with a total population of almost 11 million, an urban population of over 6 million, a density of 186 p/km$^2$, and an urban population growth rate of 3.8 percent. Added to this are the large and growing Nigerian cities: Lagos from 10.8m to 18.8m by 2020; Ibadan from 2.8m to 5m, Ogbomosho from 1m to 1.8m, and Ilorin from 0.8m to 1.4 m. Clearly, this is a strategic region.

The only planned region-wide interventions to date are the approved, though not yet aligned, Trans West Africa Highway and the proposed railway network along the coast. These projects will increase the region's attractiveness for economic development and will bring with it more rapid population growth and urbanisation.

The most prevalent cities in Ghana are Accra, Kumasi and Sekondi Takoradi. Sekondi Takoradi, like Tema is a coastal city and important seaport. Its industries are timber, cocoa processing, plywood, shipbuilding, harbour and railway repair, and more recently, sweet crude oil and crude oil. Kumasi is a city in Ashanti Region and is widely known as the “Garden City” because it is near Lake Bosomtwe, is in a rain forest region and is the cultural capital of the country. These three cities form the “Golden Triangle” which is a key driver of national growth. The cities are strategically linked by road and rail and Kumasi creates the inland gateway for the coastal areas.

While reference is made to Accra, spatially Accra is not only a city anymore, but has grown into a region of urban and economic activities. GAR’s spatial development centres on Accra and Tema, which are the administrative and economic cornerstones. Though, approximately 25km apart, urban growth has consumed the space in between the two cities to the extent that the area is completely built-up and developed. Since both are located on the coast development radiates out from each at 180˚ northwards with the main arterial roads being the conduits of development. A radial road pattern with some interlaced grid is generally evident across the region. Urban development is therefore prominent around these two centres filling in the area up to the region’s northern delineation.

However, given its elongated shape and the absence of an economic anchor, town or city to the far-east, urban growth has not been drawn to the east. Consequently, the eastern part of the region has remained undeveloped and rural. It is typified by agricultural land, villages, mining, forestry and environmental conservation areas.

The following figure illustrates this spatial dynamic in the Region.
Figure 2.6: Urban Core and Rural East

2.5 GAR in terms of the NSDF

The National Spatial Development Framework (NSDF) 2015-2035 is a national spatial and policy document geared toward formulating clear development directives for the country’s future development. The document contains a whole host of proposals and plans, yet only a few pertinent development guidelines have been extracted as an indicator of how growth and development of the GAR is seen by NSDF.

The NSDF advocates that Ghana must be integrated into the West African Economy and must do everything it can to attract investment. Hence the country should plan for population growth and in-migration, high urban populations, yet limit sprawl and fragmentation, strengthen the two largest urban areas (Accra and Kumasi) and create better rural linkages.

As for the hinterland the NSDF acknowledges that fragmentation of agricultural land is a problem and it should be limited since Ghana has less than half of the people/cropland ratio that experts recommend for sustainability. Stimulating rural productivity means providing better trading markets for agricultural produce, better market infrastructure and improved linkages and mobility between the urban areas and hinterland.

The NSDF identifies six pillars of spatial strategy which very briefly are:

- Emphasize balanced polycentric development;
- Improve regional, national and international connectivity;
- Strengthen the metropolitan city regions of Accra and Kumasi and focus on Accra as the engine of growth, magnet of investment and gateway to international trade;
- Promote development in networks and secondary cities; and
• Ensure sustainable development and protection of ecological assets.

With particular reference to Accra and its region the NSDF proposes to:
• Promote Accra Capital Region as a world class city and ensure that it can compete with places such as Lagos and Abidjan by establishing its role as a regional business, trade and investment hub (a role no other city can play);
• Promote existing urban settlements and discourage new ones;
• Promote larger and discourage smaller settlements;
• Improve connectivity to international markets through new and upgraded air, rail, expressway and marine infrastructure;
• Promote urban settlements along major transport corridors;
• Integrate rural settlements into expanding urban areas;
• Protect agricultural land and forests; and
• Maintain and improve efficiency of main expressway network.

Clearly GAR fulfils a multitude of roles and is important for the nation and the man on the street. The NSDF provides a clear framework of what it regards as the development focus for GAR which serves as critical input into the RSDF process.
3 A Status Quo Overview of the Greater Accra Region

The status quo overview is a brief summary of the detailed analyses contained in Volume 1 of the GAR RSDF. It sets the scene for the current planning environment.

3.1 Population and Social Environment

3.1.1 Population Profile

(a) Population Size

The total population size for the GAR was 4,010,054 persons in 2010. The chart below indicates how the population was dispersed between the various districts. It can be seen that Accra Metro contributes the largest portion (41.5%) of the population.

Chart 3.1: Population Distribution per District, 2010

![Population Distribution Chart](image)

Source: Demacon ex Ghana Statistical Service, 2010

In 2010 there were 1,036,370 households for which the average household size was 3.9 persons per household.

(b) Population distribution

There are two main types of localities in Ghana, rural and urban. Localities with 5,000 persons or more were classified as urban, while localities with less than 5,000 persons were classified as rural.

The graph below indicates the distribution of the population in GAR between urban and rural locales. The largest portion (90.5%) of the Region’s population is seen as urban.
Various districts (Accra Metro, Tema Metro, Ga Central, Ashaiman, Ledzokuku-Krowor and La Dade Kotopon) are viewed as being completely urban with no residents living in rural areas, while Shia Osudoku District has the highest portion (76.7%) of rural residents.

(c) **Age Profile**

The Region is characterised by a large segment of persons between 20 and 40 years of age. From the age profile it can be deduced that the Dependency Ratio for the GAR is 49.9%, which is relatively low. A high ratio increases the burden on the productive part of the population to maintain upbringing and pensions of the economically dependent.

(d) **Population Growth Projections**

The population has grown from 1,431,099 persons in 1984 to 4,010,054 in 2010. This constitutes an average growth rate of 4.04% per annum for the Region. The total population is expected to increase from 4.01 million persons in 2010 to 9.88 million persons in 2037. This growth is substantial. The average annual growth rate is 72,557 persons per annum. Accra Metro is the largest contributor to growth at 36.3%, growing at an average rate of 26,318 persons per annum.

The graph below illustrates the population projection over the next 20 years. The rapid population growth is projected to more than double the population from 2010 to 2037.
Plan 3.1 on the following page illustrates the anticipated population distribution by 2037 based on the aforementioned population growth.

Plan 3.1: Population Distribution 2037 (Demacon, 2016)  
*Source: Demacon, 2016*

### 3.1.2 Employment/Unemployment and Income

The level of employment reflects employment and unemployment levels in the GAR, which impacts on economic growth and disposable income patterns. Level of employment, coupled to household size is also indicative of dependency ratios.

The analysis revealed that the majority (70.9%) of the population is economically active, of these 92.2% are employed and 7.8% are unemployed. The Region is characterized by high employment levels which bodes well for the economy. Coupled with a high percentage of people who are economically active, this reflects low dependency ratios, putting less pressure on breadwinners.

The mean average annual income of urban households is GHC 20,930.05, while annual income in rural locales averages GHC 11,408.01 as per GLSS, Round 6, 2014.

### 3.1.3 Health and Health Facilities

Healthcare is generally provided by the government and administered by the Ministry of Health and Ghana Health Services. A hierarchy of health care facilities exist throughout the Region.
There are approximately 417 health facilities (mostly in the urban and peri-urban areas, but excluding facilities for La Nkwantanang-Madina MA) that cover all levels of providers. There is a new regional hospital and two new district hospitals (Dodwa and Lekma). However, there are no public hospitals in Ga Central, Ga East, Ada West, Kpone Katamanso, La-Nkwantanang and Ningo Prampram (MTDFs and the draft Dodowa SDF).

The doctor-population ratio ranges from 1:8 179 (Tema) to 1:158 437 (Ga Central). This does not compare favourably with the national figure for doctor-population ratio of 1:10 452 and the recommend standard of the World Health Organisation of 1:5 000 (Ningo-Prampram MTDF 2014, pg. 74).

Malaria tops the chart for the top five diseases in GAR, but it is mainly followed by the transmission of diseases caused by a lack of adequate sanitation. Access to safe water, basic sanitation and waste disposal are critical in maintaining a healthy environment, this implies that activities geared toward addressing the problems of sanitation can go a long way to positively influence the health status of residents in the Region.

### 3.1.4 Education and Literacy

Education and literacy serve as proxies for human development. The majority (83%) of persons 11-years and older are literate.

Ada West is the district with the lowest literacy rate (45.7%) while Accra Metro has a literacy rate of a mere 50%. Ga East has the highest literacy rate with 98.3% of persons over the age of 11 being literate.

The majority of persons 12-years and older have had at least some basic education, which includes both persons with basic and / or secondary education. A small portion (15.4%) have had some form of higher education, which includes vocational, technical and community education; post middle, secondary certificate/diploma education; and tertiary education.

### 3.1.5 Education and Education Facilities

The Ghanaian educational structure and the number of educational facilities within the GAR are illustrated in the following figure.
What is not evident in the above-mentioned figure is that the number of private schools outweighs the number of public schools. Private educational institutions are mostly located in the urban and peri-urban communities whilst very few of these are found in rural areas.

When comparing the required number of schools (as per the planning standards) with the totals in the figure below it would appear that there is an oversupply of primary and junior high schools. However, when assessing the required number of schools against the number of public schools there is shortage of primary and senior high schools in GAR (see table below).

Table 3.1: Shortage of Public Schools

<table>
<thead>
<tr>
<th>Category</th>
<th>School</th>
<th>Standard</th>
<th>Required</th>
<th>Public *</th>
<th>Shortage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td>1/5 000</td>
<td>1 011</td>
<td>863</td>
<td>-148</td>
</tr>
<tr>
<td>Junior</td>
<td></td>
<td>1/10 000</td>
<td>505</td>
<td>936</td>
<td>431</td>
</tr>
<tr>
<td>Senior</td>
<td></td>
<td>1/20 000</td>
<td>252</td>
<td>49</td>
<td>-203</td>
</tr>
</tbody>
</table>

* Excluding the figures for the La Nkwantanang-Madina Municipal Assembly

Problems experienced include: uneven distribution of schools; high enrolment in public basic schools; overcrowding, as the number of classes exceeds the number of classrooms; inadequate and poor quality educational infrastructure; public schools lack ancillary facilities (i.e. kitchens for school feeding programmes, ablution facilities, etc.); lack of libraries,
workshops, school laboratories, etc.; availability of land for the construction of educational facilities; makeshift structures for classrooms; and access to education in the rural areas.

Based on the aforementioned it is evident that GAR lacks educational facilities to accommodate the current and future needs of the population. Strangely, the measures put in place to ensure access to education is hampering the objective to eliminate illiteracy. Furthermore, this problem is aggravated by the availability of land.

3.1.6 Dwelling type and occupancy

The following graph indicates the different dwelling types of the population of the GAR.

Graph 3.3: Dwelling Types in GAR

![Graph 3.3: Dwelling Types in GAR](image)

Source: Demacon ex Ghana Statistical Service, 2010

From the above it is determined that the majority of households in the Region (55.9%) occupy a compound house (room). While compound housing still dominates the existing housing stock in GAR the proportion of supply is declining due to rapid growth in the supply of bungalows and flats (UN Habitat, 2011). A mere 17.4% of households reside in a separate house.

The current housing stock, as per the 2010 census, is 1,049,994 dwelling units. This amounts to 3.8 persons per dwelling unit, which correlates to the average household size.

Unfortunately this housing stock includes inadequate housing such as tents, improvised housing, uncompleted buildings and other undefined forms of accommodation. If these dwelling units were to be subtracted from the housing stock, only a supply of 953,149 adequate dwelling units would remain, resulting in an average occupancy of 4.2 persons per dwelling unit as per the 2010 census population and housing stock.

It must also be taken into consideration that of these 953,149 adequate dwelling units 61.6% are rooms in compounds. The main house types popular with new developers are detached and semi-detached dwellings with all services, intended for a single household.
With an average household size of 4.6 and the average number of rooms per households 2.4, the GAR has an average room density of 2.0 persons per room. All districts, except Accra Metro, have an average room density lower than that for the Region. Shia Osu Doku and Ada East have a density of 1.6 persons per room, the lowest in the Region. This implies that overcrowding is a more significant problem in Accra Metro.

3.1.7 Tenure status and housing delivery system

The dominant type of tenure at 39.9% is households residing in homes owned by another private individual. This could include rental accommodation and persons occupying rent free.

Yet, a significant portion (39.5%) of households owns the home they live in, while 1.0% is still in the process of paying off their home. This indicates that a large segment of the population represent home owners.
3.2 Natural Environment

Ghana’s Environmental Policy was promulgated with the intention of improving the life and environment for the present and future Ghanaian population. With this in mind, the environmental features and resources that exist in GAR are critical for continued maintenance of community livelihoods to fulfil physical and psychological needs. The natural environment that exists in the GAR has been summarized in the sections below.

3.2.1 Environmental Policies

The major environmental policies that have bearing on the natural environment within the Greater Accra Regions are summarised below:

- **Environmental Policy** – the aim of this policy is to increase economic development while simultaneously conserving resources through integrated decision making processes. Thus improving the livelihoods of the present and future population and achieving sustainable development.

- **The Forest and Wildlife policy** – many Ghanaians rely on natural resources for the sustenance of their daily livelihoods. Therefore, this policy is aimed at the conservation of natural resources through the integration of forest and wildlife resources. It highlights Ghanaians right to access these resources, though emphasis is also placed on the responsibility accompanying it.

- **The Land Policy** – this policy is intended to assure Ghanaians have access and ownership to land for their livelihoods, while utilising it in a manner that is sustainable.

- **National Water Policy** – this policy was introduced to ensure the sustainable distribution and utilisation of water resources within the region, which it aims to achieve through compliance and monitoring and establishments of policies and programmes.

- **Biodiversity Conservation Policy** – the intention of this policy is to conserve biodiversity within the area through the establishment of policies and education surrounding the sustainable use of resources for medicinal proposes and livelihoods.

- **Coastal and Marine Environmental Policy** – it is the intention of this policy to promote conservation and protection of marine and coastal environments and resources.

- **National Climate Change Policy** – climate change impacts for Ghanaians are by nature socio-economical, affecting not just a single sector. This policy aims to address these impacts through climate resilient and green economy policies and strategies.

3.2.2 Topography and Relief

The relief in the GAR is generally gentle with plains not exceeding 60m above sea level. Coastal plains can be found towards the south-east and west of Accra, extending 16km inwards from the sea. The topography of the region consists of a series of ridges and valleys which favour agricultural development areas. The coastlines between Accra and the Songor lagoon consist of steep slopes, however, moving eastwards, the topography of the coastline is smooth with gentle relief and no steep slopes.
3.2.3 Geology and Soils

(a) Geology

The geology comprises formations such as the Precambrian Dahomean, Birimian, Tarkwaian and Togo series formations. The coastline contains many rock outcrops which are exposed to erosion due to intensive coastal wind action.

The major geological concern is seismic activity as the effects of earthquakes in Ghana can be felt in the GAR. Factors which influence this activity are variation of rock types, depths and weathering of rocks. Due to the GAR being densely populated and moderately industrialised, the risk of the impacts associated with seismic activity is high. Risks such as destruction of property and loss of lives are some of the impacts that may be experienced should seismic activity occur.

(b) Soils

Factors such as climate and vegetation influence the types of soil formed in the area. Soil types vary in accordance to the different agro-ecological zones. The soil within the GAR ranges from black clay found in the north-east, to sandy loam in the eastern parts of the region, while the soils found in the western part of the region are nutrient rich and contain yellow and pale sandy soils which favour construction. Conflicts arise where soils favour both agriculture and construction activities.

3.2.4 Climate and Climate Change

The overall climate experienced in Ghana is monsoon type (Environmental Protection Agency, 2002), which is tropical and influenced strongly by the West African Monsoon Winds (Amlalo and Oppong-Boadi 2015). The general climatic conditions are typically warm with temperature variability occurring during different seasons (Amlalo and Oppong-Boadi 2015). Ghana comprises three main types of climatic zones, namely the southern savannah climatic belt, tropical forest and Accra plains. Of particular importance is the Accra plain which is situated along the coast of Ghana.

The climate in the Accra plains is very similar to that of the North because the area around Accra is also part of the savannah climate and lies in the coastal savannah zone. The Accra plain is an area in Ghana with less annual precipitation than the other climatic zones. Although the seasons vary between the different climatic zones and are influenced by winds, the average annual temperature is the same throughout the country which is between 26°C and 30°C (Environmental Protection Agency, 2011b), with the average in GAR being 26.3°C. The hottest months in the GAR are February and March, with the coolest being July or August alongside the coast (Ghana Meteorological Agency, 2016). The GAR has two rainfall seasons, the first from April to June with the secondary season during September and October (WMO, 2017), receiving between 713-1184mm rainfall per annum across the various parts of the region (Ghana hydro-database, 2014; Climate-data.org, 2012).
The GAR will be exposed to the impacts of increased climate change in the future as the coast along the Gulf of Guinea is already battered by strong Atlantic currents. The sea-level is expected to rise further by the year 2100, affecting low-lying coastal communities, particularly those that make a living off fishing. The mean temperature is also forecast to increase by 3.9°C by 2080. This presents increased drought risk across the country, potentially triggering secondary impacts such as migration threats into urban areas as well as further shortages in energy supplies.

3.2.5 Biodiversity

Ghana’s biodiversity is very rich, consisting of tropical high forests and savannahs. Although there are 7 national parks, none fall within the GAR. Wildlife Protected Areas (WPAs) and Ramsar Sites contained within the GAR are shown on Plan 3.2 on the following page and consist of:

- Shai Hills Resource Reserve;
- Achimoto National Forest;
- A Thicket Reserve;
- 3 Forest Reserves;
- Songor Lagoon Protected Area;
- Sakumo Lagoon Protected Area; and
- Densu Delta Protected Area.

Plan 3.2: Protected Areas in GAR

Ecologically, GAR largely comprises coastal scrubs, grassland and mangrove swamp, as well as, small portions of guinea savannah and moist semi-deciduous forest, refer to Plan 3.3 on the following page.

Plan 3.3: Vegetation in GAR

Many Ghanaians depend on forests for their livelihoods and as a result, there has been land degradation and deforestation. Deforestation is a major problem that has led to significant loss of biodiversity (La-Nkwantanang Madina Municipal, 2013). The National Development and Planning Commission and United Nations Development Programme: Ghana (2012) reported a 1.68% loss of forests per year between the years 1990 and 2010. Anthropogenic activities such as agriculture, logging and medicinal plant harvesting, fishing and mining have impacted and degraded areas.

3.2.6 Hydrology

The hydrological system forms an integral part of the Region’s livelihood. It is characterised by rivers, dams, wetlands and lagoons, three of which have RAMSAR status (Ramsar, 2015), refer to Plan 3.4 hereafter. Communities and cities depend on these systems for food, irrigation, sewerage, drinking water and hydropower generation. This accentuates the need
to protect them against further negative impacts caused by development, deforestation, industrial and agricultural activities; as well as settlements in the vicinity of these water systems, in the system’s catchment areas, and activities taking place in the system itself, which cause direct, downstream, ground and coastal water pollution (GSGSA 2014-2017, as quoted in the NSDF, by Town and Country Planning Department, 2015). These threats to the hydrological system also increase risks of, and exposure to, flooding and diseases.

Plan 3.4: Hydrology in GAR

GAR’s groundwater resources are replenished directly by precipitation and indirectly by ephemeral streams, pools and runoff water. Uses of groundwater range from domestic water supply and agricultural, to industry uses (Obuobie et al. 2016). The quality of the water is however impacted by direct and indirect waste water infiltration and agricultural runoff, and the salinity levels of groundwater render the water unfit for consumption (Adank et al. 2011).

3.2.7 Coastal Areas

The coastal zone within the GAR is dominated by rocky shores, which is located between Axim and Prampram and occurs as rocky outcroppings alternating with sandy bays, while sandy shores can be found between Prampram and Aflao. The Greater Accra coastal zone contains many estuaries, lagoons and coastal wetlands. These areas provide habitats for a wide variety of fauna and flora (Povlsen and Dahl, 2004a) and are significantly utilised for fishing.

Owing to increasing pressure on the coastal zone from conflicts over land, water and resource utilization, constraints aggravating social and sanitation issues as well as climate change impacts, there has been a notable depletion of resources and an increase in coastal erosion (UNEP, 2011). Furthermore, the habitats within the coastal zone have been polluted as a result of poor waste management and discharges from both industrial and agricultural sectors (Ministry of Environment Science and Technology, 2012).

3.2.8 Agriculture and Fishing

(a) Agriculture

Agriculture is an important sector in Ghana due to the vast contribution this sector makes to the country’s Gross Domestic Product and the number of people dependent on this sector for livelihood and income. The GAR has lower importance for agriculture than the rest of Ghana, however 10% of the population in the region is actively involved in agriculture (Choudhary and D’Alessandro, 2015). Cropland makes up 337km$^2$ of the land cover in the GAR where three (cassava, maize, rice) of the eleven major crop types are produced, whilst all other regions in Ghana produce at least seven of the eleven major crop types. This is 1% of the national area under crops, and 9% of the GAR’s land cover (Town and Country Planning Department, 2015).
(b) **Fishing**

Fishing supports multiple communities in the GAR, where for many, it provides the only source of income. Fishing practices occur frequently in all coastal wetlands where the most commonly caught fish is the Tilapia. One of Tema’s major economic sectors is the fishing industry, which includes industrial, semi-industrial and artisanal fishing practices (Sal Consult Limited 2015; as quoted by Kondra, 2016). Fish resources are at threat due to unsustainable fishing practices employed across various of the water bodies in the region, especially so in the coastal wetlands (Kondra, 2016).
3.3 Economic Environment

3.3.1 Economic base

The graph below illustrates the employment industry profile for the GAR economy. A total of 1,832,068 persons are formally employed within these sectors. Wholesale and retail trade (31.7%) (581,145 persons) and manufacturing (14.7%) (269,194 persons) are the dominant branches of activity. Approximately 5.2% of economically active persons are engaged in the agriculture, hunting, forestry and fishing industry. This proportion is far below the national average of 52.1%. More females (39.0%) are employed in wholesale and retail trade compared to 22.2% of males. There is no gender differential as far as manufacturing is concerned. However, females are about three times more likely than males to be employed in the hotels and restaurants industry.

Graph 3.4: Employment Industry Profile of GAR

The two graphs below, respectively Graph 3.5 and Graph 3.6, illustrate the employment industry profiles for the urban and rural areas of the GAR. It is evident that the largest portion (32.3%) of the urban workforce is employed in the wholesale and retail sub-sector, while the majority (42.5%) of the rural area’s workforce is active in the agricultural sector.

Source: Demacon ex Ghana Statistical Service, 2010
Graph 3.5: Employment Industry Profile of GAR – Urban Area

Source: Demacon ex Ghana Statistical Service, 2010

Graph 3.6: Employment Industry Profile of GAR – Rural Area

Source: Demacon ex Ghana Statistical Service, 2010
3.3.2 Economic Trends

(a) Employment Sectors

The following chart illustrates the employment sector profile. The majority of the population (74%) is employed in the private informal sector. Only 17% of the population is employed in the private formal sector.

![Chart 3.2: Employment Sector Profile of GAR](chart3.2.png)

Source: Demacon ex Ghana Statistical Service, 2010

As can be seen in the preceding chart 74% of the Region’s population is employed in the private informal sector. As this is the largest employment sector it can be deduced that it also plays a significant part in the regional economy.

The informal economy currently takes the form of vendors and tradesmen selling their goods and services along established transportation corridors and at certain concentration points.

(b) Foreign Direct Investment

In March 2016 the Ghana government signed four agreements between themselves and Turkey, especially to promote FDI. Ghana is trying to attract projects that would drive development in the local labour market. In 2013, the government authorised the exploitation of a new oilfield. Mining and oil exploration are the main sectors that attract the most FDI. The United Kingdom, India, China and Lebanon are the main investing countries (Santander, 2016). With the expansions of oil productions and related industries FDI is expected to continue with its upward trajectory. South African mining firm, Gold Fields, has announced its intention to invest US$ 1.4 billion in Ghana (Economist Intelligence Unit, 2016).

Accra has been ranked as the second most attractive destination for FDI in Africa, according to PWC (Allafrica, 2015). Accra is a shining example of a city that has a strong reputation throughout Africa and beyond for the quality of its communications infrastructure, low crime rates and steady democracy. A clustering of FDI in agricultural projects can be witnessed in
the GAR (Djokoto, 2012). The Volta Region also holds strong attraction to FDI projects from Germany.

FDI in the services sector has manifested in the form of *inter alia* numerous shopping centre developments. Atterbury Properties developed the 20 619m$^2$ Accra Mall in 2007, and an increase to 40 000m$^2$ is envisioned. The initial phase constituted an investment of approximately US$82 million (2016 value) with a further estimated US$77.5 million to be invested in the second phase. Hyprop also constructed the 13 000m$^2$ Achimota Mall in 2015 at an investment value of US$52 million. These investments create further sustained benefits on an annual basis in the form of business sales, job creation and taxation.

### 3.3.3 Economic Focus Areas

#### (a) Challenges Faced by the Economy

The new government will face a tight financing situation with public employment cuts, slow wage growth and privatisation all likely to be on the agenda. Industrial tensions are expected to be fuelled by the oil-related (including hydrocarbons) bump up in economic growth expected in 2017 which is not likely to translate quickly into rising living standards. This is primarily on account of the fact that these industries are extractive in nature (Economist Intelligence Unit, 2016). Impacts can only be optimised through deliberate guidelines that would oblige such extractive companies to actively invest in local economic infrastructure, including:

- Hard infrastructure (utilities, roads, electricity generation, water infrastructure, etc.);
  and
- Soft and social infrastructure (housing, educational facilities, healthcare facilities, etc.).

It would be imperative for future spatial plans to be sufficiently responsive and facilitative in this regard.

A threat to the growth picture is the maritime border dispute with Côte d’Ivoire. If the arbitration process should rule in the favour of Côte d’Ivoire the contribution of the TEN oil productions will be lost to the Ghana economy (Economist Intelligence Unit, 2016).

In the view of the aforementioned challenges the task will fall to the government to maintain sustained levels of FDI within the country. This has specific implications for the GAR as it is the main recipient of FDI within Ghana. The Region contains high-value coastal real estate, the main port, an international airport, the seat of national government and an emerging modern, mixed-use node around the airport.

A backlog in bulk infrastructure has, and continues to hinder economic growth expansion within the Region. GAR authorities face immense backlogs in most bulk services which have been to the detriment of economic development within the Region.
The economy of the GAR is primarily vested in the services sector with the manufacturing and industrial sectors lagging behind. Research is needed into value chain analyses, industrial cluster developments, and economic growth and development strategies in order to diversify the Regional economy. Such analyses will guide and inform appropriate sectoral interventions and stimuli. This could ensure sustained, effective and facilitative economic interventions which could improve the viability and sustainability of the regional economy.

A further challenge facing the expansion of the GAR economy is optimizing port based industrialization.

Implementing the principles and concepts of airport economics, which some may refer to as the aerotropolis concept, should be centred on facilitating appropriate high-tech industrialization in the vicinity of the airport.

The Spatial Development Framework should be leveraged to promote mixed-use nodal development. Real estate development and investment are often underestimated as economic development instruments.

Closely correlated with the above, traditional/chieftain systems have been found to be inhibitors of economic growth and tax base expansion. In order to optimize the potential benefits associated with real-estate development, the land tenure, valuation and taxation system should ideally be revised. Revenue base expansion will be a critical requirement to fund sustained infrastructure investment.

In view of the poor performance of the continental economic leader, South Africa, there is a unique window of opportunity emerging for other African countries to capitalize on attracting foreign investors. Over and above sound economic considerations, the key requisites, however, remain stable governance, policy certainty (including planning legislation and policies), sophisticated economic and financial systems and leadership integrity.

Sustained high rates of in-migration into the Region create challenges and opportunities. An appropriate spatial planning response is required.

(b) Growth Potential

According to the Economic Intelligence Unit (2016:9) real national GDP growth prospects are favourable for 2017/2018, boosted by the onset of new oil and gas production. The first oil from the Tweneboa-Enyenra-Ntommne (TEN) oilfields came on-stream in August 2016. Gas production from the Sonkofa fields will commence in 2018. Adding to this new growth, production from Ghana’s first oilfield, Jubilee, will recover after a series of technical problems in 2016.
Improving electricity generation will support growth as government belatedly gets to grips with boosting supply after years of severe shortages. Tariff increases will encourage investment in power generation.

Export revenue is expected to increase strongly in 2017/2018 as oil production at TEN increases and gold prices partly recover from the 2015 dip. Cocoa prices will remain strong. Export revenue growth is expected to slow in 2019 amid weaker global conditions, although those conditions will support gold prices, before an expected better performance in 2020/2021 (Economist Intelligence Unit, 2016).

Port differentiation specialisation can be observed: Whereas the port at Secondi-Takoradi handles bulk and break bulk, the port at Tema is primarily responsible for containerized goods. The port at Secondi-Takoradi is larger on account of volume considerations. The port at Tema is smaller as it is designed to accommodate relatively higher value added goods compared with Takoradi. Similarly no disaggregated import/export data is available. Based on observation it would appear that Secondi-Takoradi serves the purpose of export harbour and Tema predominantly fulfils the role of import harbour. The absence of container terminal at Takoradi precludes this harbour city from developing value added industries. Tema, however is ideally positioned to attract value adding industrial and associated enterprises. Considering that most commodities enter and exit Ghana through these two port cities it would be fair it assume that import/export statistics reflect directly on these two cities. Export growth averages 12.9%, by inference this reflects more on Takoradi. Similarly, import growth fluctuates from 10-11% and, on account of port functionality, reflects more closely on the performance of Tema port. These growth dynamics hold spatial growth and planning implications.

The chart that follows indicates the shift share between the agricultural, industrial and services sectors in Ghana. The services sector is the largest contributor (55.4%) to the national GDP and also boasts the second largest growth rate per annum (7.8%).

The shift-share analysis indicates the significance of service-sector based activity and to a lesser extent manufacturing sector growth. These dynamics hold specific future implications in regards to the demand for urban land uses, in particular industry and services.
Chart 3.3: Shift share of Sectors in Ghana

Source: Demacon ex Economic Intelligence Unit, 2016

The industrial sector is proportionately smaller and, compared with agriculture, has not yet developed to its full potential. Existing industrial activity is concentrated in Tema, Kpone Katamanso’s Free Zone, Ga South’s Free Zone and along the N1 corridor between the Kotoka International Airport and Tema. In the context of the economic needs of a metropolitan region, attracting future industrial development to the area should be a priority. Seaport access as well as the presence of an international airport both count in favour of further industrial development and expansion. Extensive investment in transport and associated infrastructure would be required to facilitate industrial growth and development, and to effectively facilitate value chain expansion.

In Ghana the informal sector is recognised in official statistics as an active economic role player: it is mainly on account of the significance of the informal sector (which employs 73.4% of the labour force) that an extremely low unemployment rate of 7.8% is achieved. The bulk of informal sector activity is interspersed with the urban fabric and more specifically in residential areas. This dynamic holds specific implications for urban planning. Consideration should be given to spatial integration of informal activity as part of future mixed-use nodes. Economic policy should furthermore be tailored to promote the development of informal activities into the mainstream formal economy.
3.4 Man-made Environment – Regional Built Environment

3.4.1 Spatial Structure

The urban core of the region centres on the two primary towns of Accra and Tema. These two towns are the administrative and economic heartland of the region, have become specialised in their own right and are the driving force of the GAR. Supporting the office, business and industrial centres are vast residential areas. These epitomise the urban environment, reflect different densities and have different abilities to deal with increased and continuing urban influx and population growth.

Beyond the area of urban concentration, primarily encompassing the eastern portion of the region is a rural zone, as shown in the figure below. The rural area comprises a range of land uses, including mining activities, forestry and forests, natural protected / conservation areas, agricultural production (formal and sustainable farming) areas and other natural features. What makes them rural, in comparison to the urban areas, is the population densities.

![Figure 3.2: Broad Spatial Structure](image)

3.4.2 Land Cover Analysis

Major land use changes in the GAR are due to the rapid population growth and influx, which is manifested in urban sprawl and extended residential development and its associated uses.

The land cover analysis, as shown in Plan 3.5 on the following page, reveals tremendous growth and sprawl. Although the density profile of the region might not reflect this, because the land area of many assembly areas have been changed / increased and so the increased population in that area cannot be appropriately rated, it is clear from the analysis that much
land transformation has occurred over the last 26 years. Urbanisation has been most prominent around the primary urban centres of Accra and Tema.

Plan 3.5: Built-up Areas from 1991-2017
Source: Esri, Digital Code, Geo Eye, Earthstar, CNE/Airbus

The plan indicates the above findings graphically and would suggest that the main regional transport routes from Accra and Tema have played an important role in creating the built-up form within the urban context. This principle also applies to the rural areas with the N1 playing a prominent role. As indicated on the plan the urban area has increased by approximately 590km², from 447km² in 1991 to 1036km² in 2017, which equates to an increase of 132%. This indicates significant growth over the last 26 years. Personal surveillance shows that the bulk of this growth is made up of residential and residential support services.

If the present spatial growth pattern is not managed, curbed and planned for, the doubling up of the 2017 spatial footprint could occur in the next 20 years, which will have dramatic impacts on the future functioning, health and service delivery ability of the GAR.

3.4.3 Regional Land Uses

This section pertains to Plan 3.6 on the following page, which has mapped the most pertinent regional land uses.

Plan 3.6: Land Use Map
Source: Esri, Digital Code, Geo Eye, Earthstar, CNE/Airbus

(a) GAR Urban Areas

The urban areas of the GAR, as indicated in the aforementioned plan, consist of land uses in support of the primary economic and employment areas (Accra and Tema), and include residential development, retail, offices, health and educational facilities, and public services required to achieve sustainable urban life. The urban areas are densely populated and include planned and unplanned developments. Informal/unplanned urban development occurs mostly along the coastline of Accra and Tema, with the largest informal development area located along the coastline of Ledzokulu.

A broad density assessment was undertaken as contained in the table below. Accra has the highest density followed by Ashaiman, Ledzokulu Krowor and then La Dade Kotopon. Thereafter are Tema, Ga-East, La-Nkwantangang Madina and Ga Central.
Table 3.2: District Densities and Urban / Rural Classification

<table>
<thead>
<tr>
<th>District</th>
<th>People / Hectare (p/Ha)</th>
<th>Categories p/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accra</td>
<td>150</td>
<td>&gt;60</td>
</tr>
<tr>
<td>Ashaiman</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Ledzokuku Krowor</td>
<td>56</td>
<td>40-60</td>
</tr>
<tr>
<td>La Dade Kotopon</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Tema</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Ga East</td>
<td>21</td>
<td>15-39</td>
</tr>
<tr>
<td>La-Nkwantanang Madina</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Ga Central</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Ga South</td>
<td>11</td>
<td>6-14</td>
</tr>
<tr>
<td>Ga West</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Adenta</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Kpone Katamanso</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Ada East</td>
<td>3</td>
<td>1-5</td>
</tr>
<tr>
<td>Ada West</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Shai Osu Doku</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Ningo Prampram</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Source: Gibb ex Census, 5-year MMDAs and Gibb GIS 2016)

Ga-South, Ga-West, Adenta and Kpone Katamanso have densities of between 6-14 dwelling units per hectare, which in the context of GAR is neither urban nor rural. These areas may have an emerging urban form but still relate to the rural hinterland and form an area of transition. Population densities do not warrant the provision of high intensity social, health, emergency and civil engineering services and so only primary services are generally delivered. It evidences that spatially the higher densities of the peri-urban areas are nearer to the urban edge while the lower densities are more remotely located.

Ada-East, Ada-West, Shai Osu Doku and Ningo Prampram located towards the eastern periphery of the GAR have the lowest population and settlement density, intercepted by vast rural lands. With densities ranging from 1-5 dwelling units per hectare, these areas are undoubtedly rural and experience no urban pressures. Formal service provision is difficult and costly therefore only moderate services exist and to gain access to secondary and tertiary services necessitates traveling to the urban centres. The only exception to this is Ningo Prampram which renders a very low density owing to the actual size of the district.

The figure that follows indicates the density distribution of people per hectare.
(b) **CBD’s and Related Uses**

The core business areas are concentrated in the CBDs of Accra and Tema. In Accra, business activities are taking place mainly towards the south of the Ring Road and along the N4. The area to the south of the Ring Road is the economic, administrative and cultural centre of Accra, hosting government ministries, hotels, businesses and financial institutions. Liberation Road forms an extension of the CBD and has developed into a mixed-use corridor connecting Kotoka International Airport (KIA) and Accra CBD. To expand the commercialisation of the airport business portfolio the KIA precinct is being develop as an Airport City including high value land uses such as corporate head offices, apartment blocks, hospitality functions and retail malls.

The implications are that the concentration of CBD-land uses in this confined space and the expansion thereof in the CBD and now at the Airport cause tremendous influx of people on a daily basis, which in turn causes associated traffic congestion. This continuous centralisation of economic activity is working towards a point where the functionality of the CBD is severely threatened.

The major land use changes related to the CBD have led to the development of Airport City and Liberation Corridor link.

(c) **Industrial and Related Uses**

Industrial development in the GAR is concentrated in the CBD of Accra, in Tema around the harbour and along the N1 (the area to the west of Ledzoku). The industrial activities in Tema are mainly concentrated around the harbour, the railway line and the area south of the N1, west of Kpone Street, south of Valco Road and east of Steel Works Road. In Accra
industrial development is predominantly taking place south of Ring Road West, west of Otublohum Road and East of Graphic Road.

(d) **Open Space**

The open space in the urban areas mainly relates to natural watercourses and wetland areas. These appear to be under threat from settlement encroachment and high levels of pollution. As far as active recreation and sport facilities are concerned, these are mainly located in the Accra metropolitan area (in and around the CBD).

(e) **Rural Land Uses and Settlements**

The north-western and eastern parts of the GAR are rural in nature with rural settlements concentrated along the main roads. Land uses in the rural settlements are centred mainly on agricultural activities and include limited retail, and health and educational facilities. Areas identified as rural residential and rural settlements include the following districts: Ga South, Ningo Prampram, Shai Osu Doku, Ada West, Ada East and portions of La Nkwantanang Madina. Although the character of Ningo Prampram is mainly rural residential a major housing development is taking place at Seglemi. This region was also identified as the ideal location for the new international airport and the Hope City Project.

(f) **Cultural and Historic Sites**

There are several noteworthy cultural and historic sites in the GAR. Some sites are dated and the buildings old originating from a bygone era. These have been and should continue to be preserved for their historic value and symbolism, as a reminder of the past and as an effort to build national worth for the people. Other sites are newer and modern but also play a cultural role in affirming national value.

Notably the majority of sites are found along the coast and in the characterful quarters of Jamestown and Ussherstown, which today is generally known as Old Accra. This is simply so because Accra is one of the oldest places in Ghana having been the port of arrival of colonial expeditions.

The most prominent cultural and historic sites in the study area include:

- Osu Castle / Fort Christianborg
- Kwame Nkrumah Memorial Park
- Independence Square / Black Star Square
- National Theatre of Ghana
- National Museum of Ghana
- Accra International Conference Centre
- Jamestown Lighthouse
- Jamestown Fort
Appraising the 1991 GAMA Land Use Proposals

In 1991 a Strategic Plan for GAMA (Planning Proposals) was prepared, as shown in Plan 3.7. More than 20 years have passed since the plans acceptance and based on the current spatial form it is necessary to appraise its achievements. It is found that:

- The greenbelt / open space areas in many instances have been overtaken by urban development and are at present severely threatened by continuing sprawl.
- The catalytic impact of the N6 road together with the main railway line was underestimated and the rural areas of Ga-West have as a consequence dramatically urbanised.
- Land earmarked for defence purposes has largely been overtaken by unplanned urban development.
- The intention of a greenbelt system is sound but its implementation can be problematic as shown in this plan.
- The road development proposals were not implemented, and although misplaced in some instances, would have assisted to alleviate the present day clogging of the road network.

Plan 3.7: GAMA Land Use Proposals 1991

3.4.4 Spatial Functionality

(a) Urban / Rural Division

There is a clear urban and rural division in GAR. The western part of the region is defined by a powerful urban core surrounded by urban settlements of moderate densities, compared to dispersed rural settlements i.e. villages located over the eastern half of the study area. The rural area is sparsely populated and typified by rural land uses. The line of division is most clear between Kpone Katamanso and Ningo Prampram as shown in the figure below. Accepting the urban and rural divide is essential to understanding the functionality of the area. These areas are different; have different roles, functions, responsibilities, focus areas, issues and pressures.
Figure 3.4: Urban / Rural Division

(b) Urban Functionality

The urban core generally incorporates all or portions of the following district areas:

- Ga-Central;
- Ga-South;
- Ga-West;
- Ga-East;
- Accra;
- La Dade Kotopon;
- Ledzokuku Krowor;
- Adenta;
- La Nkwantananga Madina;
- Katapone Katamanso;
- Ashaiman; and
- Tema.

This section explores the internal components of the urban complex and is accompanied by the figure below.
Figure 3.5: Urban Functionality

(i) Accra Urban Complex

At the centre of the urban core is Accra urban complex. It includes the old and the new city, as well as the general urban expanse around it. Accra is the capital of the country, hence it has a national function and position centred on its administrative responsibilities. It is also recognised as Ghana’s commercial hub with many businesses, hotels, some light industry, banking, government, the airport, etc. in the core area.

Having its roots in colonialism followed by nationalism the City is an important heritage centre. It boasts many cultural and historic sites, most of which are celebrated and grand to foster a sense of national pride. As the capital, Accra also serves as a gateway to the rest of Ghana and to some other West African countries. Many international flights fly to Accra from where business travellers or tourists move onto other West African destinations either by road or air.

(ii) Tema Urban Complex

Second to Accra is Tema Urban Complex. The keystone of the city is its harbour which is Ghana’s deepest seaport. It outranks Sekondi Takoradi with 1.7km² of water enclosed area, 5km of breakwaters, 12 deep-water berths, a huge tanker berth and a vast container yard. It handles 80% of Ghana’s import and export cargo and deals with goods in transit to landlocked Burkina Faso, Mali and Niger. The town was formally established when the harbour was completed in 1962. The harbour is man-made and the town was specifically planned and designed by Doxiadis and so it reveals a very structured and well-designed core. The urban area has grown significantly since 1962 and informal expansion has also occurred.
where the structured urban form was unable to keep pace with in-migration and residential demand.

(iii) Support Zones

Supporting Tema is an industrial zone slightly north of the town. It is near the N1 which is important for regional freight access and access to the airport. While the N1 is important to the industrial hub, the hub has also strengthened the N1 affirming its role as development corridor. Evidently there is a mutual interrelationship between the hub and the N1.

Where the N1 transits through the urban core it has mutated into a development corridor with access-reliant industry located along it and Accra and Tema on either end. The N1 has become an important development spine essential to the economic livelihood of the city and region. However, this has also led to congestion on the road as it is unable to handle all the traffic. The roads mobility function is totally lost in the urban core which is problematic.

While there is no definite nodal hierarchy development does occur outside the CBDs of Accra and Tema. Such development is not in nodes, but occurs along the mobility routes of the N2, N4, N6 and other arterials. Likewise to the transition of the N1 from a mobility route to a congested development corridor, so these roads have also been transformed with development tightly clustered around the radials. Though development is needed its unmanaged location hampers the proper functioning of the road hierarchy and the important radials that should feed the economic core.

Accra Airport (Kotoka International Airport) is spatially well located, near the CBD, amidst the urban core and along Liberation Road. Airport City is in the making, exploring its position and acting as a development catalyst for the CBD. The remaining undeveloped land will be explored over time to strengthen the area. Developing such in a planned and managed manner could certainly contribute to a better functional urban form. The area is characterised by residential and commercial development which leans towards businesses, offices and banking. Indeed it has affected Liberation Road transforming it into an important development corridor.

(iv) Residential Expanse

Surrounding Accra and Tema are vast and dense residential areas. These include the full range of urban land uses forming proper urban environments. There is a multitude of schools, clinics, hospitals, police stations, shops, markets, etc. However, there is little urban structure or defined form to enable the urban area to grow in a manageable manner.

The urban form is greatly defined by the road pattern, of which the N-routes play an important role. At a regional level a radial road pattern is evident. The N1 is aligned to follow the coast line providing east-west access, while several north-south roads lead from the hinterland to the coast terminating in Accra and Tema. The life of the urban area is in the roads and so points of convergence are evident. Yet these points can only be rated as weak
service nodes, because they are poorly defined, poorly serviced, there is no hierarchy and they are not managed or planned. By and large retail follows a linear pattern. This is typical of the market concept, which causes congestion on arterial roads and limits the creation of an economy of scale.

(c) Rural Functionality

Contrary to the urban agglomeration, is the vast rural hinterland that completes the GAR. The vast rural area is located north-east of the urban complex and consumes most of the north-eastern segment of the GAR, but there is a small rural area found in the north-western corner. The rural functionality of the region is shown in the following figure.

![Figure 3.6: Rural Functionality](image)

The small north-western portion, which forms part of Ga-West and Ga-South, is under significant pressure to urbanise. It is wedged between the urban core and the region’s administrative boundary. It is served by rail and regional roads and is in near proximity to the N6 which is an important regional corridor connecting Accra and Kumasi. In addition, its western location, which is where national and regional development is concentrated linking toward Sekondi Takoradi, also burdens the area. Presently the area comprises low-density urban housing, which can easily be consumed by incremental growth and unmanaged urban infill. The lack in urban structure is problematic to accommodate future growth as it will escalate the urban settlement complexities which are already pronounced throughout the Region. An undefined urban structure upon which densification occurs makes servicing of the area in future near impossible.

The vast rural area that consumes the north-eastern segment is undoubtedly rural though a fair land use mix is still evident. The area comprises intensive and extensive agriculture,
mining, villages, water bodies, forests, etc. The area is served by roads which are the lifeline of the region. Most villages are located along these roads and so appear as beads on a string.

The N1 which remains a critical corridor, stretching from Sekondi Takoradi in the west to Togo in the east typifies the nature of development all along it. Where the N1 leads into the rural hinterland development along it becomes sparser, less commercial and of a lower order. Thus while the N1 is an important regional link to the urban centres, its commercial and social resources, the character along the road also depicts its position.

The area is generally rich in water and has several wetlands. Along with the significant coastline fishing is a prime economic activity and prominent source of protein for the people.

Prampram is the most prominent town of the rural hinterland and in a sense a gateway and an edge to the urban region. The town is the largest in the area and experiences some development pressure from growth in Kpone Katamanso. This growth is spilling over into Ningo Prampram and causes some concerns.

Generally the dispersed settlement / village pattern throughout leads to poor service levels and poor infrastructure. Rural service delivery is costly and difficult and the more dispersed the settlement pattern the more complicated delivery and servicing is.

(d) Linkages

(i) International Linkage

Internationally GAR is connected to the outside world by Kotoka International Airport (KIA), located in Accra, and Tema Harbour.

As an international airport KIA has capacity for large aircrafts such as the Boeing 747-8. The airport has two terminals and in 2016 construction of the third terminal commenced so as to expand the airports passenger handling capability to 5 million passengers per year. The terminal is expected to be completed by end of July 2017. The airport handles some freight but its main focus is passengers, not only to and from Ghana but also to other West African countries. Spatially there is some vacant land around the airport which is ideally located for mixed use development and managed urban infill and growth. The airport is well connected to the N1, providing east-west connectivity, and to the N6 and N4 providing north-south connectivity to Kumasi and beyond.

Tema Harbour is the Region’s other international port and in opposition to the airport focuses on freight. Tema is Ghana’s largest harbour and in addition to handling 80% of the country’s import and export cargo it also serves as a transit point for goods to and from the northern landlocked countries. It has ideal access to the N1 and N2 allowing for cargo to readily leave the area to its ultimate destination. The port accommodates a wide range of industrial and commercial companies that produce or handle among other goods petroleum products, cement, food items, iron and steel, aluminium products and textiles. Most of the
country’s chief export i.e. cacao is shipped from Tema. Tema Harbour and Port is in the process of being expanded and upgraded to meet rising cargo traffic; and such is planned to include the purchase and instalment of cranes, reach-stackers and ship to shore cranes. The upgrades will improve the cargo-handling capacity of the port, which should continue to rise as Ghana’s economy maintains its high rate of growth.

Since the airport and the harbour are vital international links for passengers and freight access must continuously be retained and development in and around both be managed and optimised.

(ii) Regional Linkage

The regional linkages are as important as the two international ports since regional connectivity sustains the international ports. Without good regional linkages neither the airport nor Tema harbour would be able to fulfil and retain their role and function. Refer to the following figure.

![Figure 3.7: Linkages](image)

The N1 is probably the most pronounced and important regional connector. It follows the coast in an east-west alignment linking to Abidjan (Côte d’Ivoire) in the west and Lome (Togo) in the east. Cargo and passengers use the N1 to reach these destinations. Connecting to the north to Burkino Faso the N2 and N6 are important. The N2 leads north to link into the N10 north of Tamale, while the N6 connects to Kumasi and then onto Tamale from where it heads to the border of Burkino Faso.

Nationally the N1 provides access to Sekondi Takoradi, which is second to Tema, as Ghana’s international trade harbour. Hence, the harbour and access to it play an important regional
and international role. Kumasi is the gateway to Ghana’s hinterland and so the N4 and N6 are relevant regional connectors.

While all these roads are crucial to the economy of Ghana and the Region they are congested, overburdened and in need of expansion and improvements. The hauling and mobility functions of all regional connectors must be upgraded liken to the upgrades of the two international harbours in recent years.

(iii) Local Linkage

Local road linkages in the rural hinterland are good primarily because of the dispersed settlement pattern and low frequency of local travel. However, local linkages in the urban areas are very poor as traffic volumes exceed the capacity and design standards of the roads. The regional connectors lose their regional function in the urban area as traffic is so congested on the local roads spilling over onto the regional connectors. Thus the N1, N4 and N6 are exceedingly congested in the urban core so that they no longer fulfil a regional function but are overwhelmed with local traffic trying to access the economic core during morning peak periods and trying to leave the core during afternoon peak periods. This ‘hi-jacking’ of the regional corridors is an impediment to regional mobility; the regional movement of people, goods and services. The solution thereto is a seriously upgraded local road network across all urban districts and an improved urban settlement and nodal hierarchy.

(e) Land Use and Transport Integration

Integration of land use and transportation would suggest that these two critical functions of the city have to support each other, to increase the functionality of a city in general, as well as the functionality of the individual elements. On the one hand land use developments respond to the transportation system, which includes road infrastructure, access and visibility, and on the other hand transportation must respond to changing land uses by increasing the capacity of the system to meet the needs of the land uses. Both work together and are co-dependent. If the one leads without the other dysfunctionality is a sure outcome.

In the urban core land use developments have outstripped the provision of effective transport systems and infrastructure. In addition, the highly centralised urban structure of the GAR has led to a total overload of traffic on the transport/road system, which in turn has produced a breakdown in the functionality of the urban core as a whole. There is complete dysfunctionality between land use and transportation as road infrastructure has not kept up with land use changes and in reality the city is suffocating from congestion. This not only affects the duration people sit in traffic, it also affects the entire economy.

In the rural areas, settlements relate to the main road system, and therefore, have good access to and from their surrounds. At a local level this bides well for the villages, but, the regional mobility function, as discussed before being of international and national relevance,
is significantly compromised by the slowing down of regional traffic when passing through villages. Villages also tend to be spaced at regular intervals which causes a continuous speeding up and slowing down of traffic, which along regional routes is not desirable. Creative solutions need to be sought to attain fast-moving unhindered regional traffic while ensuring the safety and sustainability of rural villages.

(f) **Land Use and Engineering Services**

Rapid urban growth, in particular housing development, has not only had an impact on transportation infrastructure, it has also had a profound impact on engineering services, including all elements therefore, viz. water supply, sewer reticulation, electricity supply, waste management, etc. Continuous in-migration into the urban core has caused such significant densification, infill and sprawl to the extent that none of the engineering services have managed to keep pace. The result is demand has completely overtaken supply to the extent that major infrastructural works will be required in future. Infill has occurred without any concern for the future installation of services and has effectively led to un-coordinated land use development and to wasteful land use practices. Moreover, it hampers attempts to achieve a more efficient city structure through sensible and needed densification.

(g) **Land Use and the Natural Environment**

The GAR is endowed with an extensive natural open space system, including a fairly underutilised and underdeveloped coastline. These areas contributed significantly to the livelihoods and well-being of the general populace who remain dependent on primary resources to sustain their lives. The sustainable protection of these areas is of great importance and any encroachment onto these natural features, with specific reference to wetland areas, the coastline and floodplains, would have a negative impact on the functionality of the areas and their ability to contribute to the overall quality of the GAR. Urban sprawl, unmanaged urban developments and un-serviced urban areas will surely have a detrimental impact.

3.4.5 **Existing Spatial Planning Proposals**

All 16 Districts within GAR have compiled Medium Term Development Plans. These are plans which for the most part, include a vision and mission, a long list of programmes / projects and a general summary of existing services and infrastructure.

These reports do not have a spatial reliance or undertone and no spatial development framework for their area. They can rather be described as project implementation programmes. All reports were reviewed by the different teams to extract any and all relevant detail, but spatial proposals were lacking. Hence, none of the Medium Term Development Plans provided existing spatial planning proposals.

The only plan which has provided spatial directives is the NSDF 2015-2035, though these proposals are for all of Ghana and therefore do not filter down to detail district level for the
GAR. Nevertheless, the main elements that apply to the Region have been extracted for the sake of the RSDF.

The NSDF centres on five pillars these being:

- Emphasise balanced polycentric development;
- Improve regional, national and international connectivity;
- Strengthen the metropolitan city regions of Accra and Kumasi;
- Promote development in networks and secondary cities; and
- Ensure sustainable development and protect ecological assets.

As far as the GAR is concerned the NSDF proposes the following:

- Promote the Accra Capital Region as a world-class city while maximising the benefits this can bring to the nation as a whole, and develop regional and lower order urban centres to serve more of their regional communities’ needs locally.
- Promote urban settlements along major transport corridors by concentrating population and economic activities in urban settlements along the major transport corridors so as to improve the economic efficiencies of both.
- Plan for integration of rural settlements into expanding urban areas. Identify rural settlements that are likely to be incorporated into the expansion of nearby urban areas. Planning measures may include regularising feeder road networks, land-pooling, guided land development, re-plotting and re-blocking, and advanced identification of land for infrastructure and services.
- Protect agricultural land and forests from settlement development, identify and designate land with high or potential agricultural value, allow only agricultural use of designated agricultural land, protect most productive agricultural land and forests from further settlement development.
- Maintain and improve the efficiency of the main expressway network, by extending transport infrastructure in the main urban corridors, promoting high-occupancy of vehicles and improving public transport facilities and priorities for pedestrians and cyclists on urban streets, as well as reducing the time for commuting.

Furthermore, the NSDF embraces the Abidjan-Accra-Lagos coastal mega region / urban corridor as a major formative element, therefore it promotes the two city-regions around Accra and Kumasi, the challenge for Accra being to define it as the gateway to international trade given the rapid expansion of the city but at declining densities. For Accra and Kumasi’s development the NSDF specifically recommends adopting “city-region planning and management including city-region spatial development frameworks; promote regional accessibility; discourage scattered development; establish urban growth containment boundaries; provide ring roads where applicable; establish and strengthen development corridors; promote "centrality", or the share of the population that lives close to the city centre compared to its suburbs and periphery; promote "centeredness", or the share of jobs
and other attractions located in the main activity centres; promote high densities; promote "compactness", or the degree to which a city footprint approaches that of a circle; strengthen the central business district; invest in other urban centres; promote transport-oriented-development, or TODs; promote mixed land uses; promote public transport; discourage private vehicle use; promote alternative transport modes; promote physically connective road networks; manage traffic before building new roads; promote digital connectivity; and adopt a grid-based model for urban expansion.” (NSDF, 2015-2035)

Over and above this the NSDF proposes certain initiatives:

- A national and international expressway system;
- Upgraded and improved trunk roads;
- A national and international rail network;
- Two international airports;
- New Airport City at centre of triangle;
- Options for three new seaports;
- Green infrastructure network;
- Agricultural growth corridor;
- Proposed urban food sheds; and

### 3.4.6 Spatial Development Trends

The most prominent spatial development trends are that the western half of the study area is highly urbanised while the eastern half is rural in nature. Therefore, the development trends for the areas are generally different. It would further appear that spatial development on the whole follows historical growth paths with little intervention to re-direct development or to create a more sustainable spatial development footprint. The following brief description of current spatial development trends intends to assist in identifying possible future development options / models:

- Accra CBD remains the main activity node in GAR and as such attracts large numbers of citizens on a daily basis. The most vibrant growth area, comprising mixed commercial and residential uses, is the CBD linked to the airport including Liberation Corridor and the Airport City Complex. The most significant urban growth, mainly residential and social services, occurs on the edges of the city and is mainly unplanned with limited, if any, engineering services. This obviously causes urban sprawl and is a major concern in terms of service delivery, urban management and sustainable development in general. Refer to the figure below.
- Rural settlement growth predominantly relates to the main regional road system, with higher levels of clustering in the eastern and north-western corners of the region. The dispersed settlement pattern complicates the delivery of services, including engineering, social and commercial services. Refer to the figure below.

- The present notion is to strengthen Tema, KIA and Accra CBD and to connect these with the existing road network and mixed use corridors. It appears to be a natural progression of historical trends and, although, in theory this should be a workable concept, in practice it would only contribute to a more congested and non-sustainable city structure.
The absence of a nodal hierarchy to support a hierarchy of urban roads and an efficient public transport system, neither of which exist, is clear and this has an unquestionable negative impact on the functionality of the city, as illustrated below.

Figure 3.10: Lack of Urban Support Structure

Oduponkehe area to the west of the study area is an attractive growth area and influences the functionality of GAR. With the proposed new airport site to the east of Tema, north of the N1 national road, influencing urban development and land investment, it could be argued a linear urban structure is in the making. Refer to the figure below. However, this must not be assumed at this stage since it will be an important aspect of this planning project.

Figure 3.11: West-East Pull Factors
The above observations reflect on regional trends at play in GAR and are merely informative as regards the planning process. They also only represent prevailing spatial trends.
3.5 Man-made Environment – Road Infrastructure and Transportation

3.5.1 The Road Network

In GAR, like in the rest of Ghana, the roads are classified by jurisdiction and not by function and ownership classification is as follow:

- Trunk Roads under the jurisdiction of Ghana Highway Authority;
- Urban Roads under the jurisdiction of Department Of Urban Roads; and
- Feeder Roads under jurisdiction of Department of Feeder Roads

Plan 3.8 on following page shows the existing GAR road network. It consists of trunk roads (shown in red, under jurisdiction of GHA) which connect the various regions, regional capitals and neighbouring countries, feeder roads (shown in orange, under jurisdiction of DFR), while the remainder is urban roads.

After studying the District Medium Development Plans, the following was observed:

- Trunk roads are surfaced and generally in good condition;
- Surfaced feeder roads are also generally in good condition;
- Most of the feeder roads are not surfaced and conditions vary from fair to poor. Problems are especially encountered during the rainy season;
- Unsurfaced roads require continuous maintenance, which poses problems for the Assemblies; and
- The more rural assemblies listed the lack of access to proper roads as a problem. Some farming and fishery communities find it difficult to transport their goods which impacts their livelihood.

Plan 3.8: GAR Road Network

The demand for transportation is inbound (towards Accra) in the morning and represents 62% of the trips. All roads are highly congested with 37% operating at unacceptable service levels of less than 15km/h and only 24% above acceptable levels of more than 30km/h throughout the day, refer to the figure below.
Authorities have embarked on a road improvement programme with 15 ongoing projects and a further 10 projects still to commence.

(a) The Abidjan-Lagos Highway Corridor

At a continental scale, the most relevant on-going infrastructure development is the Trans-African Highway (TAH). The TAH network is made of 9 continental corridors, within which, the corridor TAH 7 (Abidjan-Lagos corridor) links Ghana to other African countries on an east-west axis, as shown in the accompanying figure. The TAH 7 leads from Dakar to Lagos, passing through Accra. It continues as TAH 8 Lagos-Mombasa and forms in total a 10,269km east-west crossing of the continent. This highway joins with TAH 1 to form an additional north-south route around the western extremity of the continent. The alignment of the TAH 7 is not fixed and needs to be determined.
TAH is a project developed as part of the UN support to the African Union (AU) and Program (New Partnership for Africa’s Development (NEPAD)), with funding from the African Development Bank. At a sub-regional scale, the project is supported by the Economic Community of West African States (ECOWAS), which drives the development and maintenance of TAH 5 and 7.

3.5.2 The Rail Network

(a) Current Rail network

The Ghana Railway Company Limited (GRC) currently operates two Diesel Multiple Units (DMUs) and one Diesel Hydraulic Locomotive train. Apart from the two DMUs which are relatively new, the Diesel Hydraulic Locomotive train is more than 28 years old and is not in a good condition. These units operate commuter rail services on two routes which form part of the so-called Eastern Line, these being the Accra-Tema and Accra-Nsawam Lines. The Accra-Tema service operates 2 trains each making 2 trips a day and the Accra-Nsawam service operates 1 train making 4 trips a day. Both railway lines support only passenger transport even though the Accra-Tema Line passes through Tema Port. Together, the lines only serve a few passengers in the GAR, those who live along the railway lines. The current rail line is illustrated in the accompanying figure.

![Figure 3.14: Current Railway Network in GAMA](image)

Source: Transportation Master Plan Project in GAR, 2016

Future development of the railway should consider implementing a train service that supports intermodal transport of goods and people from the port to inland areas in Accra and Ghana.

(b) Future Rail Network

(i) Railway Master Plan of Ghana

Ghana Railway Development Authority established the Railway Master Plan of Ghana which in 2013 included GAR. The Government of Ghana has given prior importance for the rehabilitation, extension and development of the entire national network to take into account the necessities of northern Ghana, the bordering countries and the objectives of ECOWAS, identifying a plan for a new railway network.

The Rail Master Plan identified six Phases for the rehabilitation and extension of the network. In Phase 1, 668km of the original narrow gauge line is to be rehabilitated and in the following five phases the network is to be extended by a further 3 340km of new lines. In addition the
1st phase will be converted to standard gauge. In 33 years a total of 4 008km of lines will be realised for an investment of US$21,508 million.

The proposed upgrades to be implemented during the six phases of the Rail Master Plan are shown in the accompanying figure.

The Transport Master Plan (TMP) recommends two north-south axis and one west-east axis network. The Rail Master Plan of Ghana (MP) 2013 proposes a Coastal Line from Accra to Asoprochona (Labadi Corridor, towards Tema). It is proposed that the Rail Master Plan’s (MP) new line should be changed from Labadi corridor to Kwame Nkrumah Motorway corridor.

In the short-term, a side track should be installed with two stations and four halts to increase the number of train operations. In the long-term, a new line should be constructed from Adenta Station to Accra Station to cover Liberation corridor, and all existing tracks should be improved to standard double tracks. The table below and plan that follows show the TMP GAMA Rail Network Plan.

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Short-Term</th>
<th>Middle-Term</th>
<th>Long-Term</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railway Line</td>
<td>Accra-Amasaman (Rehabilitation) Achimota-Asoprochona (Rehabilitation)</td>
<td>Accra-Amasaman (Expansion) Achimota-Tema (Expansion)</td>
<td>Achimota-Kasoa (Construction) Accra-Airport-Adenta (Construction_Subway)</td>
<td>4 lines</td>
</tr>
<tr>
<td>Length</td>
<td>(24.9km) (23.7km)</td>
<td>(24.9km) (30.2km)</td>
<td>25.8km 21.9km</td>
<td>47.7km (103.7km)</td>
</tr>
<tr>
<td>Station</td>
<td>Circle, Achimota, Dzorwulu, Shangrila, Adegonor and Queensland station</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
3.5.3 Aviation Infrastructure

Aviation in Ghana is regulated by the Ghana Civil Aviation Authority (GCAA). However, the Ghana Airports Company Limited (GACL) was formed in 2006 to manage flights in all airports and airstrips of Ghana. Therefore, GACL manages the only international airport in Ghana, the Kotoka International Airport (KIA).

In 2013, KIA ranked 3rd in West Africa based on the number of passenger visits to Accra. The airport is served by about 30 international airlines, of which twelve (40%) are from Africa, 17% or five are from the West, three (10% each) are from both South and East and one from the East (3%).

Seven Cargo airlines serve the airport with various destinations in Africa and Europe and four cities in Ghana are served by the Kotoka International Airport.

There are four domestic air transport operators at the Kotoka International Airport: Africa World Airlines (AWA), Starbow Airlines, Arik Air and Antrak Air. These companies provide internal flights within Ghana from KIA to major cities such as Tamale, Sunyani, Kumasi and Takoradi.

Since Kotoka International Airport is currently the only point of entry via air to Ghana, the focus of development shall be concentrated on Accra. It is vital for the whole system that this airport provides the necessary capacity and delivers the required level of service while maintaining a high standard of safety and security.
Current KIA constraints include runway capacity in future, terminal capacity especially the domestic terminal, integration between international and the domestic terminal, and land side access.

Initiatives (projects) have been identified to develop KIA which will be sufficient till 2035 should they be implemented.

3.5.4 Maritime Infrastructure

(a) Existing Maritime Infrastructure

- Tema Port, the only port in GAR, serves Ghana and other landlocked countries such as Burkina Faso, Mali and Niger. It is managed by the Ghana Ports and Harbours Authority (GPHA). Performance indicated that although the number of vessels decreased slightly overall tonnage has increased.

(b) Tema Port Upgrades

In response to growing maritime trade demands in Ghana and the sub region, Ghana Ports and Harbours Authority (GPHA) is upgrading and expanding the Ports of Ghana. Projects completed in Tema Port in 2016 included:

- A 450m long by 50m wide bulk jetty capable of berthing four vessels at the same time. The facility has increased the port’s berthing capacity from 14 to 16 berths.
- A new dedicated 840 point reefer terminal which includes offices for regulatory stakeholders within the reefer clearance chain.
- A new revenue centre for one stop processing of all port payments this is located strategically by the customs long room to make it easier for port users.
- A concrete net mending wharf with a solar lighting system to facilitate the activities of local artisanal fishermen as part of the Port Authority’s Corporate Social Responsibility Initiatives.

The expanded port will have a 1.4km quay with four deep berths, equipped with sophisticated container handling gantry cranes and terminal operating systems. Its capacity to accommodate cargo ships will consequently be four times greater than currently. Tema Port will then be able to handle some of the world’s biggest container ships, carrying up to 18,000 containers.

(c) Fishing and Sea Transport

As this region has a very long shore line, fishing activities play a vital role in the localised economies of some villages close to the sea. A common theme identified in the Medium Term Development Plans of the District is that attention should be given to this activity. From a transportation point the flowing is important:

- Provision of landing beaches/fishing harbours;
- Cooling storage facilities at the landing sites;
- Space for proceeding of fishing products;
- Assistance with acquisition of safe fishing vessels and outboard motors for boats
- Good road connectivity from these villages to the major road network for transportation of their goods and access to the villages

No evidence could be found that any sea transport passenger services exist or are rendered. This is in-line with general practices throughout the world. Sea transport services generally provided for cross water transport and not along the coast line. The main reason for this is the cost of infrastructure. Purpose-built landing-site infrastructure must be provided and boats/ferries that will be used for these services must adhere to very stringent safety requirements. Competing services by land are also generally faster with shorter journey times. It is therefore recommended that this mode not to be considered as a commuter service for the people of GAR.

3.5.5 Road Based Public Transport

In GAR, public transport is operated largely by informal transport service operators with a mix of vehicles, including mini-buses with capacities ranging from 15 to 23 passenger seats, popularly known as “trotro”. In GAR, trotros account for the largest modal share of over 62.2%, making it the most patronized mode of transport. Even though trotro mode of transport is the most widespread, trotro road space usage is rather low. Trotros use a mere 18.3% of road space, as shown in the figure below.

**Chart 3.4: Modal Split of Vehicles on Arterial Roads in GAMA**

![Modal Split of Vehicles on Arterial Roads in GAMA](image)

*Source: Transportation Master Plan Project in GAR, 2016*

(a) Trotro Operations

- Trotro operations are generally confined to terminals from their origin to their destination.
- In general, trotros do not operate on any schedule or timetable, but commonly operate between the hours of 04:00 and 22:00 throughout the week, and most of these vehicles operate on the "fill and go" method.
- The quality of trotro vehicle services is not satisfactory.
• Road Traffic Regulations in Ghana (LI 2180) require all private transport service operators to form unions for better management and regulation by the assemblies.
• Trotros operate on 315 routes, although there are 580 registered routes.
• Apart from the normal routes, there are 150 “ghost routes” in Accra.
• Trotro fares tend to correlate with the distance travelled and are usually adjusted by the Ghana Road Transport Coordinating Council (GRTCC) when fuel prices increase.

(b) Taxi

Most taxis move freely along roads or through busy areas looking for passengers. Passengers can stop and hire one to take them to a destination. This is called “dropping”. Other taxis usually operate from terminals called taxi ranks. Passengers can visit these taxi ranks and take “dropping” to their destination. The destinations for taxis operating from taxi ranks may be fixed or flexible.

Some taxis operate from the same terminals as trotros. These taxis usually have a fixed route and operate a shuttle service between the terminal and a specific destination and charge a flat fare for any destination along that specific route.

Taxi operations may be limited to the specific area that the taxi’s union is registered for. This may be within a district or across other districts. However, most taxis occasionally travel to other areas outside their operating area. Thus taxi routes are more flexible than trotro routes. No intercity taxi routes currently exist.

As with trotros, taxi operations are regulated by the relevant district assembly. Some taxi unions are part of the Ghana Private Road Transport Union (GPRTU), others are part of Progressive Transport Owners Association (PROTOA) and the rest may belong to various local associations and cooperatives.

Generally most taxis do not have functioning air-conditioners and those that do generally do not use them. Consequently, most taxis run with windows lowered, exposing the passengers to air pollution and other breath-related sicknesses. By and large most taxis also do not have good interior and exterior looks due to poor maintenance by owners and / or drivers.

(c) Bus

(i) MMT Bus

Metro Mass Transit Limited (MMT) was created in 2003 to provide state-operated public transport services and so the government is a majority shareholder in MMT, holding approximately 45% of shares. The rest (55%) is held by the private sector. These busses carry less than 10% of all road-based passengers
There are some 1,049 MMT buses servicing both intra-city and intercity areas from Accra. The main terminals are located in Accra from where they serve major areas in the Accra Metropolis. The Ministry of Transport is the supervisory body for MMT and therefore makes important regulatory and operational decisions for the service. As is the case with most state-owned public transport systems, the quality of MMT operations is not as good as expected. Most of the buses do not have functional air conditioning and have worn interiors due to lack in maintenance and poor management.

MMT currently waives fares for school children on weekdays. The MMT fares are around 50% lower than other private intercity bus services and Trotro fares.

(ii) Private Bus

A number of private bus operators exist in GAR. These operators run their fleet as transportation companies, and so most of them only operate intercity services and have a higher quality fleet than MMT. Their buses are air-conditioned, more comfortable and have relatively better service conditions. For this reason and because they do not receive any subsidy from government, they command higher fares. These buses generally operate on a Type B Permit. Popular private bus operators in the Region include VIP, O.A Travel and Tours Limited and Great Imperial Transport Limited.

Private bus routes consist of 90% intercity and 10% intra-city routes as some private bus operators offer a tour service for hire in and around the country. Routes range from within Ghana to other countries such as Nigeria and Benin. Popular routes from Accra include major urban areas such as Kumasi, Takoradi, Sunyani, Tamale, Aflao, and regional capitals throughout the country.

On average the fares for private bus companies are about 50% (or more) more than those of state-operated services such as MMT. Some companies operate first class bus services which cost more than a regular service. Most of the private bus companies have provisions for vehicle booking and ticket reservation for their clients and also have fares for luggage.

(d) Future Public Transport Strategy

The need was identified to restructure the public transportation system in order to provide a better quality service. The present trotro-dominated service will in the near future make way for Bus and BRT. Current trotros will play a minor role, while it is proposed BRT take on a pivotal role,

The diagram below graphically illustrates the intended transformation.
In the short-term the new bus system like the arterial buses will operate on the radial arterial roads. In the mid-term the bus-oriented system would be operational and in the long-term the vision is to have the railway system as the primary mode of transport. A “Hub and Spoke” type system is proposed with an arterial bus network operating between the hubs and the trotros feeding the hubs. Major trotro terminals can be the "Hub" and bus stations and small sized terminals on the roadside or in residential areas would be the "Spoke" in the system.

There are five major arterial roads in AMA. These are Winneba Road, Nsawam Road, Liberation Road, Motor Way and Labadi Road. Almost all trotro routes are concentrated on these arterial roads, with 14 trotro routes operating on the Winneba Road. Labadi Road shows a lower density of trotro routes than other arterial roads because it is too lean and close to the beach.

The arterial bus system proposes a total number of 12 ‘Arterial Bus’ Networks, which will be a major public transit mode in the medium-term period. Almost all arterial roads will be served by the ‘Arterial Bus’ rather than the trotro. The Arterial Bus Network Plan proposal is shown in the figure below.
Bus Rapid Transit (BRT)

BRT is the most dominant method among the transit priority strategies. The BRT system of GAMA has been studied for 15 years. A previous project suggested six BRT routes in GAMA. The first pilot BRT route was recommended on Winneba Road but it has not been implemented to date. The figure below summarises the proposed BRT implementation routes in GAMA.

Figure 3.19: Arterial Bus Network Plan
Source: Transportation Master Plan Project in GAR, 2016

Figure 3.20: Proposed BRT Plan
Source: Transportation Master Plan Project in GAR, 2016
The Transport Master Plan completed in August 2016 proposed a BRT service that coincides with the arterial bus routes, thereby rendering some of the arterial bus routes redundant. The latest BRT route proposal is indicated in the figure below. This proposal will be adopted in going forward when developing the transport system for the RSDF.

![Initial Proposed BRT Plan](source: Transportation Master Plan Project in GAR, 2016)

3.5.6 Non-Motorised Transport (NMT)

Historically, most of the transport policies in GAMA have focused on traffic flow and the improvement of public transport rather than the expansion of NMT facilities such as sidewalks and bicycle-related facilities.

The results of a survey on the prevalence of existing NMT infrastructure indicated that 21.4% of the roads, whose capacity amounts to that of collector roads or more (about 155km), have sidewalks and bicycle lanes. This means GAMA does not have adequate Non-Motorized Transport (NMT) infrastructure.

The majority of major arterial roads in GAMA have sidewalks but pedestrians face interruption as the sidewalks are frequently disconnected. Furthermore, most of the roads whose capacity is that of minor arterial roads or less have no sidewalks. Sidewalks at markets and surrounding areas are occupied by street vendors who hinder pedestrian movement. In general, all existing sidewalks have poor pavement conditions. The Tetteh Quarshie-Madina section on Legon East Road has bicycle-pedestrian shared lanes.

The existing NMT network is shown below.
3.5.7 Future NMT Strategy

The strategy for improving NMT infrastructure in GAMA focuses on the following:

- Establishment of an NMT network.
- Provision of space designated for pedestrians.
- Enhancing connectivity between NMT and public transport.

The strategy is summarised in the table below with the NMT network plan shown thereafter.

Table 3.4: Strategy for Improving NMT in Ghana

<table>
<thead>
<tr>
<th>Current Conditions and Prospect</th>
<th>Improvement Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Disconnected NMT Network</td>
<td>- Establishment of NMT Network</td>
</tr>
<tr>
<td>- Disconnected NMT Network on major arterial roads</td>
<td>- Connecting disconnected NMT Network</td>
</tr>
<tr>
<td>- Halted construction of pedestrian overpasses</td>
<td>- Improving fundamental conditions for pedestrians</td>
</tr>
<tr>
<td>- Lots of roads which require crosswalks</td>
<td></td>
</tr>
<tr>
<td>- Poor Pedestrian Conditions for NMT</td>
<td>- Provision of the Space Designated for Pedestrians</td>
</tr>
<tr>
<td>- Most of the local roads don’t have separate space for pedestrians.</td>
<td>- Improving conditions for pedestrians in residential areas</td>
</tr>
<tr>
<td>- The verge of the roads is occupied by waiting and parking vehicles and is heaped with materials</td>
<td>- Implementing traffic calming project in areas with heavy pedestrian traffic</td>
</tr>
<tr>
<td>- No pedestrian-only lanes</td>
<td></td>
</tr>
<tr>
<td>- Poor Connectivity between NMT and Public Transport</td>
<td>- Enhancing Connectivity between NMT and Public Transport</td>
</tr>
<tr>
<td>- Poor accessibility for passengers of trotros</td>
<td>- Establishing networking plans which take into consideration public transport</td>
</tr>
<tr>
<td>- Small waiting space for passengers of public transport</td>
<td></td>
</tr>
</tbody>
</table>
Current Conditions and Prospect | Improvement Strategy
--- | ---
transport | - Improving conditions of the areas surrounding public transport facilities
• Lack of Comprehensive NMT Plans | • Establishment of Comprehensive NMT Plans

*Source: Transportation Master Plan Project in GAR, 2016*

### 3.5.8 Freight Transport

Road transport is by far the most important means of moving freight and is the sector that requires the greatest consideration. Roads carry 95% of passengers and 98% of the country’s freight. Even so, very little is mentioned about freight transport and heavy vehicles in all available reports. The Transport Master Plan Project in Greater Accra Region 2016, contains traffic count results which were done on most of the major roads in and around Accra, refer to the adjoining figure. The counts that were done over a 24-hour period contain results for a class vehicle classified as “Trucks”.

*Source: Transport Master Plan Project in GAR 2016*
On average trucks constitute 5% of all traffic which is a general expected norm. The composition of trucks varies throughout the network with the links with the highest number indicted in the table below.

Table 3.5: Truck Traffic

<table>
<thead>
<tr>
<th>Link No</th>
<th>No of Trucks (veh/day)</th>
<th>% Truck Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 247</td>
<td>5.8</td>
</tr>
<tr>
<td>2</td>
<td>3 260</td>
<td>5.1</td>
</tr>
<tr>
<td>3</td>
<td>1 951</td>
<td>4.3</td>
</tr>
<tr>
<td>4</td>
<td>6 581</td>
<td>10.6</td>
</tr>
<tr>
<td>5</td>
<td>3 564</td>
<td>7.7</td>
</tr>
<tr>
<td>8</td>
<td>6 723</td>
<td>9.6</td>
</tr>
<tr>
<td>9</td>
<td>2 990</td>
<td>4.7</td>
</tr>
<tr>
<td>11</td>
<td>2 999</td>
<td>4.9</td>
</tr>
<tr>
<td>12</td>
<td>2 679</td>
<td>3.9</td>
</tr>
<tr>
<td>17</td>
<td>2 188</td>
<td>4.1</td>
</tr>
<tr>
<td>18</td>
<td>2 223</td>
<td>4.1</td>
</tr>
<tr>
<td>19</td>
<td>1 916</td>
<td>4.1</td>
</tr>
<tr>
<td>27</td>
<td>1 709</td>
<td>6.1</td>
</tr>
<tr>
<td>28</td>
<td>2 734</td>
<td>7.0</td>
</tr>
</tbody>
</table>

These results clearly indicate that the major roads are used by truck traffic and that these routes must be planned and designed accordingly, to avoid congestion forcing trucks onto smaller roads.
3.6 Man-made Environment – Engineering Services

3.6.1 Water Infrastructure and Services

The ministry of Sanitation and Water Resources is an infrastructure sub-sector service organisation who is responsible for the country’s infrastructure requirements for water supply, sanitation, hydrology and flood control systems.

The following sub-agencies exist under the Ministry and are responsible for the provision of water:

- Ghana Water Company Limited (GWCL / GWC);
- Community Water and Sanitation Agency (CWSA); and

(a) Services Areas and Water Supply Coverage

Water provision for the GAR is divided into three regions, namely:

- The Western region, which receives water supply from the GWCL;
- The Eastern Region, which receives its water supply from the GWCL; and
- The Rural Areas whereby the provision of water is managed by the CWSA.

(b) Existing Water Treatment Infrastructure & Capacities

Accra Metropolitan Assembly (AMA) receives water from two sources; Weija and Kpong water works. Weija is located 15km west of Accra. It supplies water to Accra’s west and north-east districts via gravity. Raw water is drawn from River Densu and passed through three treatment plants that work in parallel; Adam Clark, Pintsh-Bamag and Candy Patterson.

Kpong is located 75km north-east of Accra. It supplies water to Tema, and eastern and central Accra. Raw water is drawn from the Volta River and passed through two plants working in parallel; Kpong Old Plant and Kpong New Plant. From the New Kpong Plant, a
The Kpong Headworks currently has three operational Water Treatment plants:

- The existing works which produces 181,818 m$^3$/day;
- The newly completed Chinese Water treatment plant which produces 186,000 m$^3$/day; and
- The old works which has an installed capacity of all three modules is 95,000 m$^3$/day.

The capacity and output of the different systems are contained in the table below.

<table>
<thead>
<tr>
<th>System Name</th>
<th>Plant Design Capacity (m$^3$/Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Kpong Works</td>
<td>181 818</td>
</tr>
<tr>
<td>Chinese Treatment Works</td>
<td>186 000</td>
</tr>
<tr>
<td>Old Works</td>
<td>95 000</td>
</tr>
<tr>
<td><strong>Total Kpong</strong></td>
<td><strong>462 818</strong></td>
</tr>
<tr>
<td>Total Weija</td>
<td>264 430</td>
</tr>
<tr>
<td><strong>Overall Total</strong></td>
<td><strong>727 248</strong></td>
</tr>
</tbody>
</table>

Refer to the plan on the following page which shows the water supply zones for the GAR.

*Plan 3.9: Water Supply Zones Map*

The water bodies mentioned that feed the water treatment plants are quite extensive, it should not be taken for granted that these water sources will sustain future growth indefinitely due to the effects of climate change. The effects of climate change are listed below:

- Decrease in the quality of freshwater;

*Figure 3.26: Kpong Water Treatment Works near Volta River*
- Amendments to the water facilities; and
- Unpredictable weather conditions.

(c) Estimated Future Water Demand

The estimated future water demand is shown in Table 3.7 below.
Table 3.7: Estimated Growth in Water Demand - GAMA

<table>
<thead>
<tr>
<th>District</th>
<th>2010 Population</th>
<th>Population Growth Rate</th>
<th>2017</th>
<th>2027</th>
<th>2037</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>($/c/d)</td>
<td>(m³/day)</td>
<td>($)/c/d)</td>
<td>(m³/day)</td>
<td>($)/c/d)</td>
</tr>
<tr>
<td>Accra Metro</td>
<td>1 665 086</td>
<td>3.10%</td>
<td>2 061 004</td>
<td>137 282 467</td>
<td>2 797 912</td>
</tr>
<tr>
<td>Tema Metro</td>
<td>292 773</td>
<td>2.60%</td>
<td>350 399</td>
<td>137 48 005</td>
<td>452 935</td>
</tr>
<tr>
<td>Adenta</td>
<td>78 215</td>
<td>2.60%</td>
<td>93 610</td>
<td>137 12 825</td>
<td>121 003</td>
</tr>
<tr>
<td>Ga East</td>
<td>147 742</td>
<td>4.20%</td>
<td>197 051</td>
<td>137 26 996</td>
<td>297 341</td>
</tr>
<tr>
<td>Ga West</td>
<td>219 788</td>
<td>4.20%</td>
<td>293 142</td>
<td>137 40 160</td>
<td>442 339</td>
</tr>
<tr>
<td>Ga South</td>
<td>411 377</td>
<td>4.30%</td>
<td>552 370</td>
<td>137 75 675</td>
<td>841 537</td>
</tr>
<tr>
<td>Ga Central</td>
<td>117 220</td>
<td>3.60%</td>
<td>150 148</td>
<td>137 20 570</td>
<td>213 854</td>
</tr>
<tr>
<td>Ashaiman</td>
<td>190 972</td>
<td>4.60%</td>
<td>261 632</td>
<td>137 35 844</td>
<td>410 212</td>
</tr>
<tr>
<td>Ledzokuku-krowor</td>
<td>227 932</td>
<td>3.10%</td>
<td>282 238</td>
<td>137 38 667</td>
<td>383 003</td>
</tr>
<tr>
<td>Ada East</td>
<td>71 671</td>
<td>3.10%</td>
<td>88 747</td>
<td>137 12 158</td>
<td>120 432</td>
</tr>
<tr>
<td>Shai Osudoku</td>
<td>51 913</td>
<td>2.40%</td>
<td>61 288</td>
<td>137 8 396</td>
<td>77 692</td>
</tr>
<tr>
<td>La Dade Kotopon</td>
<td>183 528</td>
<td>3.10%</td>
<td>227 255</td>
<td>137 31 134</td>
<td>308 390</td>
</tr>
<tr>
<td>La-Nkwant. Madina</td>
<td>111 926</td>
<td>3.10%</td>
<td>138 593</td>
<td>137 18 987</td>
<td>188 074</td>
</tr>
<tr>
<td>Kpone Katamanso</td>
<td>109 864</td>
<td>3.10%</td>
<td>136 040</td>
<td>137 18 637</td>
<td>184 609</td>
</tr>
<tr>
<td>Ningo Prampram</td>
<td>70 923</td>
<td>3.10%</td>
<td>87 821</td>
<td>137 12 031</td>
<td>119 175</td>
</tr>
<tr>
<td>Ada West</td>
<td>59 124</td>
<td>3.10%</td>
<td>73 211</td>
<td>137 10 030</td>
<td>99 348</td>
</tr>
<tr>
<td><strong>Total Greater Accra Region</strong></td>
<td><strong>4 010 054</strong></td>
<td></td>
<td><strong>5 055 348</strong></td>
<td></td>
<td><strong>692 583</strong></td>
</tr>
</tbody>
</table>
The abovementioned table is based in the following assumptions:

- The latest demographic information as obtained by the consultant; and

**Estimated Potable Water Shortage**

From the above the following pertinent issues can be highlighted as shown in the table below.

<table>
<thead>
<tr>
<th>Description</th>
<th>2017 (m³/day)</th>
<th>2027 (m³/day)</th>
<th>2037 (m³/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing WTW Capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Design</td>
<td>727 248</td>
<td>727 248</td>
<td>727 248</td>
</tr>
<tr>
<td>Estimated Demand</td>
<td>692 583</td>
<td>1 009 273</td>
<td>1 433 634</td>
</tr>
<tr>
<td>Estimated Projections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- vs. Design Capacity</td>
<td>34 665</td>
<td>-282 025</td>
<td>-706 386</td>
</tr>
</tbody>
</table>

The table above shows that the existing treatment capacity falls well short of the demand. Through interpolation, the design capacity will be reached in the year 2018. If the bulk water supply to the GAMA is not augmented the shortage in potable water will increase significantly during the next 20 years.

The following strategic elements need to be considered to ensure the current:

- Decreasing demand for water;
- Improving GWCL water supply services;
- Ensuring lower water prices for low-income households;
- Ensuring services for people outside the reach of the GWCL network;
- A Master Plan for GAR is on-going; and
- Alternative water supply systems like groundwater sources or surface water sources and / or the desalination of sea water.

### 3.6.2 Sewerage and Sanitation Infrastructure and Services

The responsibility for setting sanitation policies and coordinating funding is shared between the Ministry of Local Government and Rural Development (MLGRD) and the Ministry of Water Resources, Works and Housing (MWRWH).
(a) Existing Level of Sanitation

The current population utilises the following sanitation systems as shown in the figure:

- Water closets and communal facilities shared amongst households. The conveyance for this system is in disrepair, and as a consequence, sewage leaks out into the environment and poses health, safety and environmental risks;
- Bucket system, whereby buckets are periodically collected and disposed of at specified treatment facilities;
- Public toilets, which is by far the most widely used system;
- Pit latrine. The majority of the catchment area is low lying with a high water table. The application of pit latrines and similar systems is therefore not recommended as it pollutes the ground water; and
- There are areas with no sanitation services.

(b) Existing Treatment Capacity

There are approximately six wastewater treatment works in the GAR. The combined treatment capacity of these works is totally insufficient for the existing population let alone any future demand.

GAR has several Waste Water Treatment Plants, namely:

- Lavender Hill Faecal Waste water Treatment Plant
- The Jamestown Waste Water Treatment Plant
- Mudor Liquid Waste Water Treatment Plant
- Kotoku Septage Treatment Plant
- Thema Waste Water Treatment Plant; and
- The Accra Sewage Treatment Plant, Mudor
Figure 3.28: Lavender Hill Sewerage Disposal Site

Figure 3.29: Korle Lagoon at Korle Gonne and Jamestown

Figure 3.30: Jamestown Waste Water Treatment Works, Accra

Figure 3.31: Mudor Faecal Treatment Plant
(c) **Current and Future Treatment Capacity**

The status quo of the current Waste Water Treatment Works (WWTW) is summarised as follows:

- The current population is estimated to generate a total sewage volume of approximately 416Mℓ/d.
- There is currently no sewage treatment master plan.
- The existing WWTWs are to be evaluated to determine their capacity and upgrade requirements, they are operated and maintained as per design and the conveyance network to these treatment works will need to be.

To accommodate the projected sewer flows from increased activity and population in the GAR additional treatment facilities are required. These facilities would have to take into consideration the different technologies used to treat the sewage, the location of the treatment facility, the treated sewage to meet international standards and the possibility of further treating the sewage to create an alternative source of energy.

(d) **Key Findings**

- Limited Households have WCs, VIPs or KVIPS.
- Indiscriminate defecation and dumping in public spaces is a major issue across the board.
- Sanitation facilities include both public and private, where households without private facilities use public facilities.
- There is a Community Based Rural Development Project for the construction of water and sanitation facilities in selected communities.
- There is inadequate budgetary allocation for sanitation due to limited resources.

The following strategic elements need to be considered to ensure optimum efficiency in the sewerage system in the GAR:

- Reducing the practice of open defecation across the entire region by introducing more public toilet facilities.
- Maintaining existing sewerage infrastructure effectively and ensure that there are funds available year on year for basic maintenance on treatment plants.
- Reducing blockages in pipelines as and when these occur.
- Upgrading existing facilities to cater for existing and future demands.
- Ensuring lower service rates for low-income households.
- Compiling a Sewer Master Plan for the GAR.
3.6.3 Solid Waste Infrastructure and Services

(a) Existing Level of Waste Service

There are two landfill sites in the GAR region: Nsumia Landfill and Tema/Kpone Landfill. It is estimated that the Nsumia Landfill can take about 1,000 tonnes of solid waste daily (wastelandfill.com.gh), while the Tema/Kpone Landfill receives approximately 1,500 tonnes a day from all parts of the GAR. This is equivalent to 100 to 150 truckloads per day.

A third site, namely ACARP is situated in the city of Accra. ACARP is an integrated waste processing and recycling company established to collect, sort, process and recycle solid and liquid waste, and produce organic manure for agronomic purposes in Ghana and West Africa. The plant is operated by Zoomlion.

The solid waste management challenges that face the GAR region are attributed to poor maintenance, lack of public awareness, financial constraints and a lack of environmental policy enforcement.

If these challenges are not addressed, it could create adverse effects on the health and safety of the population in the GAR region, the environment and inhibit the operation on the civil services and infrastructure.

One way of addressing one of the solid waste management challenges previously mentioned, sustainable solid waste practices can be introduced. These practices aim to optimise the reuse of solid waste before it is deposed. Refer to the figure below for the solid waste hierarchy.

![Waste Hierarchy Pyramid](image)

Figure 3.32: Waste Hierarchy Pyramid

Waste generation in the GAR is around 2,578 tonnes per day. The Accra Compost & Recycling Plant (ACARP) currently only recycles around 300 tonnes of waste material per day. Taking this into account, it is evident that only a fraction of daily waste is being recycled.
(b) Key findings

- Due to sprawl and uncontrolled development in the urban areas refuse collection companies are finding it difficult to access many of the areas.
- Waste is mostly collected door to door by private waste management contractors.
- Indiscriminate dumping occurs in public spaces.
- A substantial amount of waste is generated in each assembly with only approximately 60% collected, leaving a constant backlog.
- Solid waste collection in GAR is mostly privatised.
- In some areas drainage facilities are choked with solid waste.
- Houses which are registered for waste collection receive priority.
- Only a fraction of the waste generated per day is recycled.
- The net effect of poor solid waste management is directly related to severe water pollution and the clogging of waterways and drains.
- Access to informal settlements is limited and therefore waste collection is sporadic.
3.6.4 Stormwater Infrastructure

The key findings from the status quo analysis are:

- The majority of the drainage issues in the GAR can be attributed to poor maintenance on existing drainage, the lack of proper drainage in urban areas and the lack of planning and design of stormwater facilities.
- The Hydrological Services Department (HSD) is responsible for the programming and

---

Figure 3.33: Informal Dump Sites on Open Land, Streams and Stormwater Channels

Figure 3.34: Natural Stormwater Channel filled with Solid Waste
coordination of coastal protection works, the construction and maintenance of stormwater drains countrywide and the monitoring and evaluation of surface water bodies in respect of floods.

- Indiscriminate dumping of solid and liquid waste into the stormwater system creates blockages and flooding across the region.

- The areas shown in **Plan 3.10** are within the Accra built up area and are extremely sensitive to flooding. Unfortunately these areas have to a large extent been built up and rehabilitation of these should be a priority in the redevelopment of the city.

- The increase of impermeable surfaces leads to increased stormwater runoff volumes. The increase in impermeable surfaces is due to the expansion of urban areas. Green belts, parks and nature reserves should be protected to ensure that rainwater infiltration can take place reducing the stormwater runoff.

**Plan 3.10: Flood Prone Areas and Types of Floods in GAR**

### 3.6.5 Communication Infrastructure and Services

The GAR is well serviced by fixed line telecommunication as well as mobile service providers. The mobile phone market in Ghana is one of the most developed in Africa with nine telecommunications operators (table below). The majority of these are mobile operators with only two, with fixed line capabilities.

**Table 3.9: Ghana – Telecommunication Services Providers**

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airtel</td>
<td>Mobile</td>
</tr>
<tr>
<td>Expresso</td>
<td>Mobile</td>
</tr>
<tr>
<td>Glo Ghana</td>
<td>Mobile</td>
</tr>
<tr>
<td>Millicom Ghana (Tigo)</td>
<td>Mobile</td>
</tr>
<tr>
<td>MTN Ghana</td>
<td>Mobile</td>
</tr>
<tr>
<td>Vodafone (Ghana Telecom)</td>
<td>Fixed Line &amp; Mobile</td>
</tr>
<tr>
<td>Teligent Wireless</td>
<td>Fixed Wireless Services</td>
</tr>
<tr>
<td>Mobile Choice</td>
<td>Mobile</td>
</tr>
<tr>
<td>Gateway</td>
<td>Fixed Line &amp; Mobile</td>
</tr>
</tbody>
</table>

Mobile infrastructure and networks are typified as follows:
• 2G coverage is commonly available while 3G coverage is still quite new and limited to the major urban centres.

• MTN started with 4G LTE tests in Ghana with the aim of launching the service in the 3rd Quarter of 2017. According to MTN, 4G services are now available in every regional capital and some large towns.

• Ghana Telecommunications Company Limited, a telecoms company provides mobile, fixed line, internet, voice and data solutions.

• Mobile technology is constantly advancing, expanding and increasing.

• Various International companies, consortiums and local companies are funding the installation and expansion of fibre optic cables within Accra. These companies include Google, Vodacom, Glo-Ghana, and MTN.

• Submarine cable services are available in Ghana and the landing points are concentrated in Accra.

3.6.6 Energy Infrastructure and Services

The Ghana power system has been experiencing supply challenges since 2012, this includes Greater Accra where some of the most significant supply challenges in the country have been identified. Ongoing efforts by government and stakeholders in the power sector have been made to continue to resolve the power supply challenges. There are a number of projects that are under discussion and may be developed. For GAR the main findings are:

• The national projected energy consumption for 2015 was beyond supply capacity in the region. This was still the case during 2016 which was estimated at 16,798 GWh and supply was only 16,448 GWh. The remaining 396 GWh would have to be shed mainly during the first two months because of expected supply deficit in 2016. Projections show a continued lag in supply relative to demand well into the year 2021 as shown in the graph below.
Akosombo hydroelectric generating station, which is the largest generating station in the country is recording very low reservoir elevations which required its output in 2016 to be limited. Hence full generation at the power station was not possible.

The transmission system has inadequate firm transfer capability to some of the major load centres (of Accra, Kumasi, Tarkwa, etc.) mostly at peak. Hence even if the power stations could generate the required capacity to meet demand – the grid system simply does not have the capability to transmit the full required supply. Some intervention and investment is required.

The transmission network has just enough capacity to transmit the projected power generation from all generation stations to the load centres during normal operating condition(s) for some sections of the networks. However, there are some critical lines for which a single contingency will put the power system in alert state, resulting in overloading of adjacent line circuits, low NITS voltages and in some cases, severe system disturbances. These lines are all primarily located within Greater Accra.

Low supply, fuel rationing, large amounts of imported fuels and fuel prices significantly influence power supply levels.

The Ghana power system functions on low reserve margins in 2016 and therefore when units are out for maintenance the system is prone to inadequate supply.

Renewables are a critical element to the energy mix of future regional developments. This will provide the balanced power and energy portfolio that mitigates low reservoir elevations and low fuel supplies for the thermal power stations. Future developments must have renewable energy as part of its core development organisation.
• Improved network typology and architecture must form part of new development going forward to avoid network loads that are islanded in the event of outage on some radial lines.

• Unmanaged densification poses uncontrolled and unpredictable demand on the system. Excessive densification within a limited space poses problems with capacity, space for services and a concentration of unsightly installations that take away from the natural visual character of the urban space.

• It is therefore evident that continued investment in energy generation, transmission and distribution projects forms a critical element of development planning considerations for the region.

• For Greater Accra, sustainable development means that there will always be a requirement for additional generation and supply investment, particularly if the grid system is to function with adequate reserve margins.
3.7 Institutional Environment

Ghana is divided into ten administrative regions headed by regional ministers. The Greater Accra Region (Accra), being one of 10 Regions, is made up of 16 district assemblies. Every district assembly is responsible for the effective development of the Region. The purpose of the District Assemblies is to ensure people are more in control over their own affairs and therefore no part of the country would be neglected. (LaVerle Berry, 1994).

A District Assembly is the highest political and administrative authority in each region and is responsible for:

- Formulating and executing plans, programmes and strategies for the effective development of the region;
- Creating town or area councils and unit committees; and
- Providing guidance, giving direction to and supervising the other administrative authorities in the district.

The Local Government Act (Act 462) specifies the structures (organogram) operating at the district level. It would suggest a sound institutional framework for the district to manage and control the area. Such a governing structure is needed to implement projects, manage growth and control land uses.

To assist and support the District Assemblies a Regional Coordinating Committee (RCC) was established within each region. The purpose of the RCC is to formulate and coordinate programmes through consultation with the assemblies located within the region. The RCC is responsible for harmonising its programmes with national development policies and priorities, and for mentoring, implementing and evaluating programmes and projects within the region.

The analysis found:

- There is a good institutional framework in place;
- Institutional capacity is lacking as evidenced by lack of project implementation and urban management and this needs to be improved;
- Strong regional leadership is required; and
- Service delivery, across the board and across the various government responsibilities at a regional level is of paramount importance.

3.7.1 National Infrastructure Plan

The draft final National Infrastructure Plan (2013) describes Ghana’s infrastructure as “inadequate, outmoded or in a serious state of disrepair”. Accordingly, the objective of NIP is “to elaborate and concretize infrastructure objectives of the Ghana Shared Growth and Development Agenda (2010-2013) and beyond”. NIP provides a vision and recommendations
for investment in six infrastructure sectors: energy; transport; information and communications technology; floods, water and waste management; shelter and human settlements; and social infrastructure. NIP recognises the need for national level spatial coordination of its proposals. The RSDF has addressed all these issues in the baseline assessment providing greater clarity on the status quo.

3.7.2 Long-Term National Development Plan for Ghana (2018-2057)

Although the RSDF is more aimed at the spatial issues and management thereof, the proposals made embrace the institutional goals as set out in the Long-Term National Development Plan for Ghana 2018-2057, these being:

1. To build an industrialised, inclusive and resilient economy;
2. To create an equitable, healthy and disciplined society;
3. To build safe, well-planned and sustainable communities;
4. To build effective, efficient and dynamic institutions; and
5. To strengthen Ghana’s role in international affairs.
4 Greater Accra Main Findings and Vision

4.1 Main Findings

Through the comprehensive status quo analysis, summarised in Chapter 3, many things were learnt of GAR and an endless list of findings could be deduced. However, needing to stay focused for the RSDF only the most critical findings were extracted. The 10 main findings from the entire analysis are listed and described in the table below:

Table 4.1: Main Findings

<table>
<thead>
<tr>
<th>Main Findings</th>
<th>Problem Description</th>
</tr>
</thead>
</table>
| (a) Population growth | • The Region continues to experience natural population growth and in-migrating from other regions and the rural hinterland.  
|                     | • Projected growth shows that in the next 20 year the total population will have doubled from 5 055 348 (2017) to 9 887 131 (2037).  
|                     | • These people will have to be accommodated in the urban area of GAR since they are urbanising which is a global trend.  
|                     | • They will need: houses, transportation, water, electricity, jobs, schools, health services, etc. and they will generate waste, sewage and pollution.  
|                     | • The RSDF must plan for this profound growth.                                      |
| (b) Urban sprawl   | • Growth is uncontained and un-prohibited.                                          
|                     | • There are no stringent guidelines that define where growth may and may not occur.  
|                     | • Growth is not deterred by the absence of engineering services or infrastructure.  
|                     | • Growth encroaches onto vulnerable natural areas and is destroying valuable hinterland and livelihoods of the rural populace.  
|                     | • Uncontained and unplanned growth makes retrofitting engineering services near impossible as well as urban management and land use control.  
|                     | • Current urban growth has a horizontal profile (rather than vertical).             |
| (c) Traffic congestion | • All roads, and in particularly the trunk roads, are so overburdened that traffic is often brought to a standstill.  
|                     | • Roads keep the economy alive as they enable the movement of people, goods and services. Roads are the lifelines of the economy and on this premise GAR is suffocating.  
|                     | • All transport is affected – private, public and freight.  
|                     | • Transportation infrastructure has not kept up with urban growth; demand outstrips supply.  
<p>|                     | • The road hierarchy has been compromised and regional / trunk routes now act as local distributors. |</p>
<table>
<thead>
<tr>
<th>Main Findings</th>
<th>Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The rail operates under capacity and is inefficient.</td>
</tr>
<tr>
<td></td>
<td>• The entire existing public transport system must be improved and expanded.</td>
</tr>
<tr>
<td></td>
<td>• There is no integrated planning between land use and transportation, though they are highly reliant on one another.</td>
</tr>
<tr>
<td>(d) Centralised</td>
<td>• For a region of this size there is very little urban differentiation.</td>
</tr>
<tr>
<td>urban structure</td>
<td>• Spatially the economy is highly centralised with most activity concentrated on Accra and some on Tema.</td>
</tr>
<tr>
<td></td>
<td>• This is a primary cause for the traffic congestion.</td>
</tr>
<tr>
<td></td>
<td>• The level of concentration on Accra could very well lead to the city’s demise as it cannot function properly.</td>
</tr>
<tr>
<td></td>
<td>• Accra city’s land use mix is also deficient of a proportional residential component.</td>
</tr>
<tr>
<td>(e) Encumbered</td>
<td>• All engineering services are insufficient, underperforming and poorly maintained.</td>
</tr>
<tr>
<td>engineering services</td>
<td>• There is no integration of land use and engineering services planning.</td>
</tr>
<tr>
<td>(urban and rural)</td>
<td>• Unmanaged urban growth has made retrofitting engineering services in built up areas near impossible.</td>
</tr>
<tr>
<td></td>
<td>• Immense new infrastructure and installations are required to plan for the projected population growth, over and above fixing the existing supply shortages.</td>
</tr>
<tr>
<td>(f) Poorly developed rural service centres</td>
<td>• There are many settlements, which are very dispersed complicating service delivery.</td>
</tr>
<tr>
<td></td>
<td>• Rural service delivery is ad hoc because there is no hierarchy of rural settlements to balance the provision of primary and secondary social services.</td>
</tr>
<tr>
<td></td>
<td>• The rural economic base is poorly defined and is very much left to its own devises.</td>
</tr>
<tr>
<td></td>
<td>• Regional connectivity is cumbersome owing to the design of villages around and onto the roads.</td>
</tr>
<tr>
<td>(g) Services-sector</td>
<td>• The service-sector is the largest contributor to GDP and has the second largest growth rate. This is positive and should be embraced.</td>
</tr>
<tr>
<td>economic growth</td>
<td>• Opportunities should be explored to encourage service-sector growth making spatial provision for its development.</td>
</tr>
<tr>
<td></td>
<td>• Economic growth and employment provision (formal and informal) are important in improving quality of life.</td>
</tr>
<tr>
<td>(h) Management</td>
<td>• While there is a good institutional framework and relevant legislation, there is limited institutional capacity and enforcement.</td>
</tr>
<tr>
<td>pressure</td>
<td>• Strong regional leadership is required to redirect GAR’s growth</td>
</tr>
</tbody>
</table>
Main Findings | Problem Description
---|---
| as proposed in the RSDF.  
• There are many mechanisms that can effect change, but they must be implemented. For that leadership is essential.

(i) Open space degradation | • There are many open spaces which have specific roles and functions for the region, local populace and economy.  
• Sensitive areas should be protected for many are being encroached upon and as a consequence being degraded.  
• Uncontrolled urban growth is a main contributor to the problem.  
• The fact that the open spaces cannot be rigidly conserved because they serve the livelihoods of the rural populace complicates the conservation mechanisms.

(j) Quantity of rural centres | • There is a vast amount of rural centres dispersed over the rural hinterland and their expansion, the establishment of new ones and their placement must be managed.  
• The purpose of rural centres is to preserve the rural environment and to provide rudimentary services to the residents.  
• However, this is not managed and so rural encroachment becomes a problem.

4.2 Potential Remedial Mechanisms

The findings reveal that GAR is facing several problems and many of these have and will continue to have a negative impact on the region, affecting the quality of life, sustainability, urban efficiency, livelihood, economic potential and service delivery of the region. It is also clear that the Region can do better and it need not be held captive by its present situation. Though the problems are real they are not without solutions and options, and these are not foreign to the planning community. Many cities and regions have had similar problems, constraints and concerns and so tried and tested remedial mechanisms have been devised to turn the tide. Potential remedial mechanisms as they relate to each of the 10 Main Findings are contained in the table below. Often remedial mechanisms apply to more than one element as one mechanism can counter more than one problem area. Such remedies are therefore a priority for inclusion in the RSDF.

Table 4.2: Potential Remedial Mechanisms

<table>
<thead>
<tr>
<th>Main Findings</th>
<th>Potential Remedial Mechanisms</th>
</tr>
</thead>
</table>
| (a) Population growth | • Quantify and intently plan for the projected growth.  
• Create clearly demarcated development areas.  
• Promote appropriate densification, which means appropriate densities in appropriate locations. |
<table>
<thead>
<tr>
<th>Main Findings</th>
<th>Potential Remedial Mechanisms</th>
</tr>
</thead>
</table>
| • Adjusted urban planning standards to suite a high density city, which means to build facilities so that land is used more effectively and height options are explored, thus working towards vertical and not only horizontal construction.  
• Note the proximity of Kasoa and Nsawam to GAR. | |
| **(b) Urban sprawl** | • Define and demarcate an urban boundary / edge.  
• Apply sensible guidelines for the edge so that its alignment can be enforced / controlled. The guidelines should include using:  
  - Natural features  
  - Administrative boundaries  
  - Existing urban form  
  - Growth direction  
  - Bulk infrastructure  
  - Existing planning proposals  
  - Future growth direction  
• Adopt a densification model  
  - Spatially define where densification should occur (nodes, public transport corridors, TODs, etc.)  
  - Define the guidelines of densification (height, coverage, typology, etc.)  
  - The density model to be an integral part of the urban hierarchy.  
• Focus service delivery towards the planned growth areas  
• Institutionally direct resources to manage and control growth in the right areas and away from unwanted areas. |
| **(c) Traffic congestion** | • Public transport  
  - Can there be deviation from current system and network  
  - Start with BRT  
  - Trotos, taxis still remain important  
  - NMTs are a nice to have but will be concentrated in walkable nodes  
• New roads  
• Road hierarchy  
• Alternative modes (NMT, rail, etc.)  
• Transport and land use integration  
• Dedicated truck routes and truck parks  
• Decentralised nodes  
• Mixed land use  
• Improve existing public transport systems  
• TODs |
| **(d) Centralised urban structure** | • Decentralisation is a necessity.  
• A hierarchy of nodes must be implemented.  
• Accra and Tema must be supported by different level nodes with defined content and activities. |
<table>
<thead>
<tr>
<th>Main Findings</th>
<th>Potential Remedial Mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The residential component in existing nodes must be increased to achieve functional balance.</td>
<td>• A rural settlement / service centre hierarchy must be implemented.</td>
</tr>
<tr>
<td>• Transit Oriented Developments (TODs) must be identified</td>
<td>• Social and engineering standards must be assigned to the hierarchy to have clear guidelines for implementation.</td>
</tr>
<tr>
<td>• Public transport must be improved to de-clog the roads.</td>
<td>• Efforts should be made to extend and encourage some formalisation of the rural economic base – tourism, recreation, food production, fisheries, etc.</td>
</tr>
<tr>
<td>• Create both transport corridors and development corridors in support of the nodal hierarchy and functional urban form.</td>
<td>• Explore tourism opportunities.</td>
</tr>
<tr>
<td>• Create new and supportive nodes throughout the urban region.</td>
<td>• Regional connectivity through the rural hinterland must be revisited to achieve improvements and greater safety.</td>
</tr>
</tbody>
</table>

(e) Encumbered engineering services (urban and rural)

- A priority is the compilation of Integrated Development Plans for the delivery of all engineering services.
- Focus service delivery in the short and medium term on the nodal hierarchy and designated urban growth areas.
- Service delivery standards must be defined for ALL new developments ensuring that from this point forward, formal services will be rendered and the Region will become serviced one development at a time.
- Investigate new technologies which could assist individual developments to handle their own services.
- Explore job creation and economic opportunities associated with engineering service delivery. E.g. decentralise waste collection to locals / individuals.

(f) Poorly developed rural service centres

- A rural settlement / service centre hierarchy must be implemented.
- Social and engineering standards must be assigned to the hierarchy to have clear guidelines for implementation.
- Efforts should be made to extend and encourage some formalisation of the rural economic base – tourism, recreation, food production, fisheries, etc.
- Explore tourism opportunities.
- Regional connectivity through the rural hinterland must be revisited to achieve improvements and greater safety.

(g) Services-sector economic growth

- There is a multitude of spatial mechanisms to spatially accommodate the service-sector and facilitate economic growth.
- Where applicable the RSDF should make provision for strategic opportunity areas or catalytic interventions such as:
  - New dedicated / specialised / niche nodes;
  - Mixed land use nodes;
  - Specific strategic opportunity zones, e.g. CBD, beach / waterfront, universities, airport, harbour, etc.
  - Transport corridors;
  - Development corridors;
  - Recommendations for aerodrome development
  - Focussed informal trade areas, new markets, and maintaining and upgrading existing markets;
  - Trans African Highway;
<table>
<thead>
<tr>
<th>Main Findings</th>
<th>Potential Remedial Mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Growing tourism</td>
<td>- Adopt and implement the RSDF.</td>
</tr>
<tr>
<td>- Creative food production;</td>
<td>- Compile integrated land use and transportation plans.</td>
</tr>
<tr>
<td>- Hierarchy of nodes (urban and rural)</td>
<td>- Compile integrated land use and engineering services plans.</td>
</tr>
<tr>
<td>(h) Management pressure</td>
<td>- Maintain all infrastructure.</td>
</tr>
<tr>
<td></td>
<td>- Control unwanted growth.</td>
</tr>
<tr>
<td></td>
<td>- Focus all development initiatives on the new growth areas.</td>
</tr>
<tr>
<td>(i) Open space degradation</td>
<td>- Define and implement an urban boundary / edge delimiting urban growth and thereby curbing unmanaged and unplanned encroachment.</td>
</tr>
<tr>
<td></td>
<td>- Officially demarcate the protected natural areas / open spaces and provide conservation guidelines that will see to their protection and retention.</td>
</tr>
<tr>
<td></td>
<td>- Ensure that the Strategic Environmental Assessment (SEA) provides guidelines on the protection of the natural sensitive areas.</td>
</tr>
<tr>
<td>(j) Quantity of Rural centres</td>
<td>- A hierarchy of rural service centres / towns should be established and implemented.</td>
</tr>
<tr>
<td></td>
<td>- An approach in respect of existing villages should be adopted whereby no new villages will be established and only certain ones may be expanded.</td>
</tr>
<tr>
<td></td>
<td>- Service delivery will be determined by the hierarchical model to provide appropriate-level facilities only.</td>
</tr>
<tr>
<td></td>
<td>- Access and regional linkages must be better planned.</td>
</tr>
</tbody>
</table>

The success of the remedies is globally evident. Therefore, where suitable they have been applied in the RSDF and where they are encountered in the detail discussion, it is evident that the main finding which triggered the remedy is being addressed to provide a solution for the present problem.

How the remedial mechanism will be applied will be influenced by the Region’s vision. The vision sets the tone and indicates where the emphasis for future spatial planning and development for the Region should be.
4.3 Vision

The role of the vision for GAR is to provide a united view on the broad principles which should guide all development in the region over the short, medium and long terms.

The primary elements that informed the formulation of the vision included the following:

- The National Spatial Development Framework (NSDF);
- Six Pillars of the Spatial Strategy; and
- From the 1991 Strategic Plan for GAMA.

The following Vision has been formulated:

VISION

The vision for Greater Accra Region is to be a sustainable, liveable and safe region with improved connectivity and engineering services to enable better efficiency and management of the social, natural, built, economic and institutional spheres to lead the region into a prosperous future for all.
5  **Formulating the Plan**

The following diagram graphically illustrates the manner in which the GARSDF was developed through utilising the vision; considering likely development models; formulating a clear and modest concept; and contemplating locational alternatives / options where appropriate.

The chapter that follows (Chapter 6) deals with the development models and the spatial concept, while developmental alternatives and options are discussed in Chapter 7 as integrated components of the planning proposals.

![Figure 5.1: Formulating the Plan](image-url)
6 Development Models and Spatial Concept

6.1 Development Models

Although the main findings give clear pointers as to the spatial pattern required, consideration should be given to alternative models. They provide an opportunity to truly examine favourable and less favourable outcomes before embarking on a chosen route. To arrive at a realistic and preferred development model, three growth models were evaluated. Each model is discussed and evaluated, following which the preferred model is further investigated.

6.1.1 Business as Usual – Laissez-Faire

This model emphasises the uncontrolled growth of the city as at present. Urban sprawl is at the forefront of the situation, whilst high levels of congestion continue as a consequence. With poor urban management, it is evident that the two primary city centres are under increasing pressure to perform with the added burden of poor service delivery and infrastructure provision. This is the sinking sand model where the continued state of regional development is unstructured, unplanned and uncoordinated due to increasing backlogs. This model is destined to lead to an unsustainable region. Moreover continuous urban sprawl will remain a threat to the adjoining rural areas and sensitive environmental zones, and the rural form will remain undefined and unstructured.

Figure 6.1: Model 1 - Business as Usual
6.1.2 Edge City Development

The lack of efficient public transportation contributes to the high levels of congestion experienced in the nodes / centres surrounding Accra and Tema. The routes of congestion lead to linear sprawl which hinder proper service delivery and infrastructure provision, which then leads to an unsustainable region.

The nodes outside the region, namely Kasoa in the west and Nsawam in the north as well as the proposed airport node to the east, will absorb the congestion of the current central region and promote further sprawl.

Continuous urban sprawl will remain a threat to the adjoining rural areas and sensitive environmental zones and reinforce the lack of structure in these rural areas.

In this model the long term sustainability of the region is a concern.

![Figure 6.2: Model 2 - Edge City](image)

6.1.3 Polycentric / Nodal Regional Structure

In this model a multi-nodal approach and planned compact urban form are proposed. The strategic interventions will lead to the redirection of traffic flow, the protection of the environment and curbing of urban sprawl. It will also be possible to achieve improved connectivity as well as higher levels of efficiency through a hierarchy of nodes and road connections throughout the entire region. This compact city structure and more structured rural environment will lead to a sustainable, liveable region. The option will require proactive planning and implementation and improved capital investment.
6.1.4 Preferred Model

The three models were succinctly evaluated based on the criteria listed in the table/matix. The criteria are contemporary town planning parameters which are widely used to determine the levels of support of basic liveable components of a city. The outcomes of the evaluation are shown in the table, and it reveals that the third model achieved the best results.

Table 6.1: Evaluation Matrix for Regional Development Models

<table>
<thead>
<tr>
<th>Components of a liveable city</th>
<th>Business as usual</th>
<th>Edge city</th>
<th>Polycentric / Nodal Regional Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental protection</td>
<td>✗</td>
<td>✿</td>
<td>✓</td>
</tr>
<tr>
<td>Public transportation</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Walkability</td>
<td>✗</td>
<td>✿</td>
<td>✓</td>
</tr>
<tr>
<td>Mixed land use</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Appropriate densification</td>
<td>✗</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Accessibility</td>
<td>✗</td>
<td>✿</td>
<td>✔</td>
</tr>
<tr>
<td>Connectivity</td>
<td>✗</td>
<td>✗</td>
<td>✔</td>
</tr>
</tbody>
</table>

✔ Yes  ✗ No  ✿ To some extent

The third and preferred model refers to a compact regional structure, where different nodes function in support of each other by means of efficient public transport systems and corridor developments. Traffic congestion is alleviated while transport and land use is better
integrated to support a mix of uses in appropriate locations and at appropriate densities. The model also refers to the retrofitting of the CBD and the revitalisation of this key function in the city structure. The polycentric nature of this model caters for the urban and rural environment, and emphasises the distribution of management and institutional capacity.

It is clear that this model needs to be pursued in the preparation of the RSDF.

6.2 Spatial Development Concept

6.2.1 Introduction

The preferred spatial development model – which refers to a polycentric compact region – is based on the following specific building blocks:

- Demarcated urban area;
- Extended transport network;
- Protected environmental resources / areas;
- Hierarchy of urban nodes and rural centres; and
- Improved connectivity and mobility.

By exploring these building blocks/ guiding principles for development, it is possible to formulate the spatial concept for the final plan for the GAR.

The purpose of the Spatial Development Concept (SDC) is to provide strategic guidance for the spatial restructuring of the entire region so as to guide the development proposals and strategies to achieve the objectives of the SDC. The purpose of the concept is not only to guide the future development of the area, but also to ensure integration of the urban and rural areas.

The development of the SDC starts with an understanding of the regional spatial characteristics since these will guide where certain types of developments should or could take place and how these areas relate to each other, and it will indicate the opportunities and challenges that the SDC need to address.

6.2.2 Building Blocks

For GAR to function in a sustainable manner it needs to adhere to specific guiding principles / building blocks. The section below elaborates on these.

- **Demarcated urban area**: The area should determine the exact extent of the urban development area so that service delivery and infrastructure provision can be determined according to a realistic timeframe and management scheme.

- **Extended transport network**: The region should be supported by a backbone of public transportation whilst providing different modes of transport to fulfil the varying needs of the citizens and the economy. The integration of land use and transportation is of
utmost importance as this will determine the efficient functioning of the region in a physical, social and economic sense.

- **Protected environmental resources and areas**: The sensitive areas should be integrated in the greater plan for the development of the region and could act as ‘lungs’ for the region so that development does not suffocate the region and deprive it from its natural resources. The open spaces also serve an economic purpose for the rural populace and this in itself must be protected and retained so as to not burden the urban system.

- **Hierarchy of urban nodes and rural centres**: By determining the hierarchy of a node or centre, more effective service delivery and infrastructure provision can be supplied. Management of these nodes and centres, including administrative and fiscal tasks such as budget allocation, will also take place more efficiently in accordance with its ranked level of service. A hierarchy across the urban and rural region will create an improved legible region and facilitate better planning.

- **Improved connectivity and mobility**: The region must be internally connected so that the various nodes and centres do not function in isolation but can be mutually supportive and dependent. As the transport network is strengthened and used to connect the different nodes and centres, the overall mobility of the region will also improve which again will contribute to improved and equal accessibility for all citizens. This will have a spin-off effect on the economy which can operate more freely with improved movement of people, goods and services. Moreover the region will better link with the adjacent areas so as to integrate in a more efficient manner and improve overall spatial functionality.

### 6.2.3 Concept

The spatial development concept for the Greater Accra Region, both urban and rural, is based on the building blocks underlying the preferred development option of a polycentric compact region. This means that the following is considered:

- The concept provides for a green, open space system in order to protect the region’s natural resources;
- An effective transport system is provided, comprising different modes of transport, promoting public and non-motorised transport;
- A mix of land uses are included to create zones where transport and land use are integrated so that transit-oriented nodes can more easily develop and in doing so, support the compactness and efficiency of the region;
- Appropriate densification is proposed at locations where the areas will not suffocate and the functionality of nodes and corridors will not be debilitated;
- Access to opportunities within the region are created with equality and ease in mind;
- The zones within the urban and rural areas of the greater region are connected through corridors, nodes and functional activity.
• The rural area be developed as a rural region, at a rural scale, protecting the resources improving its structure and enabling regional connectivity through the area.

The concept will guide the development of the Regional Spatial Development Framework in which the same principles will be adhered to so that a sustainable and liveable region can be achieved.

![Figure 6.4: Spatial Development Concept](image)

The concept shows that there is distinction between the urban and rural regions of the GAR. That the urban areas will be compactly developed with legible large-scale nodes that radiate out from the centre of the region (Accra) to the suburban areas, bringing to them employment, retail, industry and business opportunities since they are currently poorly serviced with those opportunities. These opportunities will be concentrated in the regional nodes that will have similar composition and yet be distinctive in character. These nodes will be mixed-use high-density centres where public transport and non-motorised transport should prevail. The entire urban area should be well served with engineering services (water, sanitation, electricity, telecommunications, waste disposal, etc.), engineering infrastructure (roads, rail, public transport, stormwater management) and social support uses (education, health, recreation, institutional facilities, etc.). The rural area will be retained for rural, conservation, recreation and farming purposes, and will be developed to uplift and support the social, health and infrastructure needs of the rural community. So the rural hinterland will be covered by a grid of high order roads that will pass by the rural settlements providing easy access to them and hence to the regional nodes. The region will be framed by a high-order mobility route that traverses the region from east to west providing much needed national and international access to adjoining regions and countries.

6.2.4 Conclusion

The above concept emphasises the need to deal with the regional spatial issues as a first priority and matter of urgency in order to direct the development of all facets of the region; where the plan firstly indicates where all regional capital investment should occur, from
which all local development investment should follow. Accordingly, this concept guides the planning of settlement space, of economic development space, of environmental space and of transport systems which need to connect these spaces at the regional and local levels.

The concept provides clear direction for major capital investment to be directed at establishing a robust regional development framework and that such framework informs where major and minor investment and development should take place to achieve sustainability.
7 Greater Accra RSDF

The Main Findings, Vision and Spatial Development Concept are the planning instruments that form the foundation of the proposed GAR Regional Spatial Development Framework. Without them the RSDF would not be anchored in sound planning to produce a robust framework to deal with the region’s existing problems or plan for a prosperous future. The planning process and analysis have indicated that the key spatial drivers are the open space system, the transportation system and network, a definite structured urban form and a structured rural environment to support the region.

7.1 Regional Spatial Development Framework

The RSDF for GAR is unique in that the region comprises an evident divide between the urban and rural areas, which is supported by the open space form, population figures and economic analysis.

7.1.1 Spatial Composition

The GAR, covers a total area of 4 354 km\(^2\) of which approximately 35\% (1 512 km\(^2\)) is proposed for urban land uses and 2 842km\(^2\) for rural land uses. The division has an important impact on service provision, economic strengths, social service delivery, productivity and role and responsibility. Urban and rural areas have different requirements, and so it is necessary to recognise, accept and plan for each individually. The urban development boundary as described in Section 7.3.1 defines the urban and rural areas.

7.1.2 Population Composition

The total population for GAR in 2017 equates to 5 055 348 people. Based on the physical divide of the region it is obvious that the population is also divided in an urban and rural populace. Determining the population split is fundamental to the RSDF, as the outcome influences all elements of the plan, importantly housing demand, land demand, economic spatial growth, engineering services requirements, etc. A plan without spatial projections is simply void.

For purposes of this study the ratios of urban versus rural population (as per the census figures) had to be adjusted according to the actual urban settlement pattern and functionality. Defining the split required delineating the urban boundary and determining the area of each district falling within and / or outside of the boundary. In accordance the district divide is a follows:

- **Urban component / population** includes Ga West, Ga Central, 80\% of Ga South, Ga East, Accra, La Dade Kotopon, Krowor, Madina, Adenta, Katamanso, Tema, Ashaiman and 80\% of Ningo Prampram; and

- **Rural component / population** includes 20\% of Ga South, 20\% of Ningo Prampram, Shai Osu Doku, Ada West and Ada East.
Based on the total population figure the divide for 2017 and projected divide for 2037 is shown in the table below. The figures are a summation of the district population figures from the status quo analysis either at 100% or at the applicable proportion for Ga South and Ningo Prampram.

To ensure the accuracy of the figures, the output was measured against a sample density determination and measuring of the urbanised areas in Prampram and Ga-South regions since these are the divided districts.

Table 7.1: Urban / Rural Population Divide

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>% Composition</th>
<th>2037</th>
<th>% Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban *</td>
<td>4 704 054</td>
<td>93%</td>
<td>9 195 031</td>
<td>93%</td>
</tr>
<tr>
<td>Rural **</td>
<td>351 294</td>
<td>7%</td>
<td>692 100</td>
<td>7%</td>
</tr>
<tr>
<td>Total Region</td>
<td>5 055 348</td>
<td>100%</td>
<td>9 887 131</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Urban refers to all district populations excluding 20% of Ga South, 20% of Ningo Prampram, Shai Osu Doku, Ada West and Ada East (which constitute the rural area**)

The population figures reveal that a mere 7% of the region’s population is classified as being rural, while 93%, an overwhelming majority, is urban. This being said, the rural area still plays a major role in supporting the urban core enabling 350 000 people to be self-sufficient.

7.1.3 Economic Composition

The Greater Accra Region is the administrative, economic and industrial hub of Ghana. The GAR economy is primarily founded in services sector activities, including the broad spectrum of private sector retail and health care activities as well as government administrative and defence functions.

The economic analysis showed a clear divide in the economic focus of the two areas. The economy of rural GAR hinges on mining activities, forestry, fishing, agricultural production (formal and sustainable farming) and an emerging tourism sector. Agriculture as primary economic sector dominates the rural hinterland.

In comparison the GAR urban economy is more diversified and includes, inter alia, offices, industrial, retail and informal trade, which is bolstered by the fact that Accra is the capital city of Ghana and Tema is the international port and industrial hub, both establishing an important trade gateway for many West African countries. The urban economy is largely centred around the secondary and tertiary economic sectors. The significance of the primary sector is less pronounced although the importance of associated product value chains should not be underestimated. This is attested to by, inter alia, the large number of companies and organisations that have established headquarters in and around the Accra District. These companies are typically involved in service sector activities (e.g. consulting, finances, insurance and auditing, legal, IT/telecommunications). Linkages with the mining sector and commodities are also evident. The services sector has also experienced appreciable capital
injections in recent years on account of substantial investments in new shopping centres and associated commercial assets.

The Region accommodates the single largest international airport (Kotoka International Airport) in Ghana, which serves as the most important access point for international business and leisure tourists. Growth in the services and industrial sectors is accompanied by concomitant growth in international trade and tourism. These sectors have systematically surpassed the historic importance of GAR as an exporter of selected agricultural products.

7.1.4 Fundamentals for the RSDF

There are three important elements which underlie the GARSDF.

(a) One RSDF with Two Components

The above provides strong motivation for the RSDF to be divided into two components, viz. a rural spatial development component and an urban spatial development component. However, the two components do not represent independent plans, but together produce ONE Plan and ONE RSDF as an integrated entity. The division is purely a practical way for dealing with a complex integrated region and helps the RSDF to provide clear guidelines for each region giving special and dedicated attention to the needs and proposals for each area.
(b) Context of GAR

Cognisance should be taken that the Region does not exist in isolation. GAR is contextualised by places such as Kasoa, Nsawam and Volta River / Lake. Though they fall outside the study area, and were not investigated per se, they have pull and push factors that apply to the Region. Kasoa, located on the coast near the western boundary of the study area, is a large growing urban agglomeration, and this growth will surely impact the Region. Though this is something to be noted, its impact would be felt only in the medium to long term. Nsawam has a similar impact though being north and more removed from the Region’s boundary and being at a lesser scale, long term plans should consider its actual impact. Volta River and Lake, an expanding tourism destination and important water-cargo-transport link, act as a magnet and enforce Accra as a tourism arrival and cargo destination, while also encouraging emerging tourism facilities on the eastern edge of the Region. Clearly Kasoa and Nsawam impact the urban component of the Region, while Volta River and Lake impact the rural region. Trying to deal with the impact of these on the Region in this SDF will draw attention away from the internal priority areas which need to be addressed and may overburden the existing SDF which faces many challenges and priority interventions.

(c) Sustainability

The entire RSDF will be built on the principle of SUSTAINABILITY. Sustainability is generally defined as “meeting the needs of the present without compromising the ability of future generation to meet their own needs” (Bruntland Report, 1987). However, the notion of sustainability has moved away from an all-encompassing definition, to practical and applicable strategies which address specific issues. As in the case with development planning, sustainability is the culmination of various processes and the fusion of various disciplines.

For the GARSDF to be an effective sustainability tool the five basic development environments should be balanced, viz.:

- Natural environment;
- Built environment;
- Social environment;
- Economic environment; and
- Institutional environment.

In view of the aforementioned the figure below illustrates the focus areas of sustainability within the context of each of the environments.
Careful consideration has been given to available resources, systems and structures. Therefore on the outset it can be stated that as far as possible all existing structures, nodes, villages, district capitals, roads, transportation systems, plants and service providers will be retained. However, proposals will be made on making improvements to the current systems, structures and mechanism so as to create sustainable urban and rural form and optimally use all infrastructure supported by the creation of new systems, services and infrastructure.
7.2 Rural Spatial Development Component

The discussion which follows relates to the rural component of the RSDF shown on Plan 7.1.

Plan 7.1: Rural Component of the Regional Spatial Development Framework

The rural spatial development component provides dedicated spatial development guidelines for the rural region.

The development philosophy hinges on the following principles already alluded to in the beginning of the study. Here their outcome in respect of the rural region is defined:

- **Concentration** – to create a hierarchy of areas of concentration for the benefit of the rural populace to access essential services and thereby to improve their quality of life.
- **Conservation** – to counter the degradation of all natural resources so that the rural lands are retained, protected and continue to contribute to the livelihoods of thousands.
- **Good linkage** – to develop the inherent economy in the rural areas in support of the urban area.
- **Sustainability** – to ensure that the rural resources are sustained for future generations.

7.2.1 The Rural Area

The rural area is defined by the newly delineated urban boundary. The urban boundary is discussed in full as part of the urban spatial development component of the RSDF, since it is mostly considered an urban management tool.

However, the urban boundary will serve the rural area well in that:

- It creates an exact line of separation between the urban and rural areas thereby clearly separating management functions avoiding or lessening confusion and poor decision making;
- It allows for the rural area to have its own standing in the RSDF with dedicated development proposals; and
- It facilitates the protection of the rural area from urban encroachment and should aid in achieving better conservation of environmentally sensitive areas.

The rural region is the land mass that falls outside the urban boundary and constitutes 2,842km² or 65% of the GAR. It is a substantial area which should be protected from undesirable urban expanse and rural mismanagement. There may be an opinion that rural areas can be left to their own devices and don’t need planning, management or control. That is a misconception, and lack of due attention results in depleted rural resources upon which the region is actually highly reliant.
The Greater Accra rural region comprises three primary land uses. These are:

- **Sensitive natural areas**, comprising a range of conservation worthy elements including rivers, ridges, wetlands / mangroves / swamps, grasslands, forests, dams / lakes, the ocean, coastal belt, etc. These areas are conservation worthy, play an important environmental role and should be legally protected from exploitation. The definition of exploitation in Ghana’s context is not so easy to define.

- **Functional rural areas**, which sustain the livelihoods of over 300,000 people (2017) and a projected approximate 690,000 in 2037. These include agricultural-based activities such as logging, grazing, some cultivation, deforestation, mining for sand and salt, fishing (which is most dominant), etc. Land cultivation is limited owing to poor soils and so agriculture relates more to forestry and fishing. The scale at which both occur is moderately sustainable at this stage, but it will reach a tipping point some time in the future. Mining is an important industrial activity which crosses the boundary between urban and rural functions, but being more rurally based is an important employment provider for the rural populace.

- **Settlements / villages**, which are grouping of rural housing stock near one another served by some rudimentary services. According to the planning standards of Ghana a rural village / settlement is a settlement of 5,000 people or less. A settlement above 5,000 people is deemed to be urban.

Management of the rural resources is critical because a balance must be found between protecting the sensitive areas, allowing the rural populace to use the sensitive resources for their livelihoods and between this, to ensure long-term sustainability. The SEA was prepared concurrent to the preparation of the RSDF and the outcomes will assist to ensure implementation.

### 7.2.2 Development of the Rural Environment

#### (a) Natural Environment

Key environmental criteria identified during the literature review were used to develop the natural environment plan, as shown in the table below:

<table>
<thead>
<tr>
<th>Environmental Criteria</th>
<th>Rationale for Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Reserve</td>
<td>These areas are integral in the livelihoods of communities as they provide products and services. These areas are also harvested sustainably which allows for a degree of conservation.</td>
</tr>
<tr>
<td>Protected Areas</td>
<td>These areas are integral in the livelihoods of communities as they provide products and services. These areas are also harvested sustainably which allows for a degree of conservation.</td>
</tr>
<tr>
<td>Forestry or Game Reserve</td>
<td>These areas are integral in the livelihoods of communities as they provide products and services. These areas are also harvested sustainably which allows for a degree of conservation.</td>
</tr>
</tbody>
</table>
Environmental Criteria | Rationale for Protection
--- | ---
**Purposes** | harvested sustainably which allows for a degree of conservation.
**Drainage Lines / Wetlands / Water body / Salt flats** | Pollution in the hydrological system is of concern. Additional development may result in further pollution affecting livelihoods that rely on this natural resource.
| Terms of hydrology and climate change, flooding is a major issue for areas within the GAR. Therefore drainage lines, wetlands, water bodies, rivers and salt flats should be avoided to reduce increased run-off and siltation.

**Proposed Greenbelt** | To serve as an environmental area in which planning, environmental, socio-economic and other relevant issues are addressed for long-term solutions.
| To impose a barrier consisting of selected physical features reinforced by planning controls to check the outward sprawl of the Accra-Tema conurbation.
| To ensure that land use within the greenbelt is consistent with the maintenance of a predominantly rural landscape, and the conservation of soils, water sources, vegetation and scenic and historical areas.

**Highly Suitable Agricultural Zones** | Agricultural and food security is vital for livelihoods of communities.
**Riverine vegetation / Riverine vegetation with/without scattered farms** | Riverine vegetation is vital for maintaining slope stability and preventing erosion (ecosystem services). These also create habitats for various species.

**Reserved shrub-thicket / Reserved mosaic of thickets and grassland** | These areas are integral in the livelihoods of communities as they provide products and services. These areas are also harvested sustainably which allows for a degree of conservation.

**Beach** | Habitat for variety of species and an important landscape feature.

Refer to the thematic Natural Open Space Plan as included in Appendix A.

The aim of the open space system is to provide areas that; based on the natural resources present and the role the resources play within the greater context of the region, should not be considered for high impact development (i.e. dense housing, industrial development etc.). These areas essentially form an integral part of the ecological infrastructure and the socio-ecological system. The rationale for this approach is that the Man and the Biosphere programme has been adopted and implemented by the Environmental Protection Agency (Ghana) in order to reduce biodiversity loss, improve livelihoods and enhance social and economic and cultural conditions for environmental sustainability, through the concept that
biodiversity and communities should support the relationship between human and biodiversity.

The natural environment within the rural context is characterised by a reliance on the natural environment by local communities to ensure continued livelihoods and to from part of the rural economy. Main drivers of the natural environment within the rural area include agricultural areas (both grazing and crops), natural resource harvesting (e.g. firewood); forestry and fishing. In addition, there are areas for potential tourism through the presence of reserves (i.e. Shai Hills and the Songor Lagoon).

(b) **Rural Economic Drivers / Indicators**

The economic analysis indicates the following sectors to be the main drivers of the economy in the rural region of the GAR:

- **Agricultural sector, including:**
  - Agriculture;
  - Forestry; and
  - Fishing.
- **Services sector, including:**
  - Wholesale, retail and motor repairs;
  - Accommodation and food service activities (tourism);
  - Transportation and storage;
  - Education; and
  - Public administration.
- **Industrial sector, including:**
  - Manufacturing;
  - Construction; and
  - Salt mining and sand quarrying.

It is recommended that the above activities be planned for within the context of the formalised settlement strategy, with most of the proposed development to take place in the proposed market towns. Density bonuses and incentives could be offered in urban areas to curb growth pressures in rural areas.

In a number of rural districts, mining activity continually encroaches on lagoons and protected areas. Planning instruments would be required to secure the future prosperity of these areas. There is scope, although limited on account of encroaching activity, for formalised, higher-end coastal housing and tourism accommodation in the rural areas bordering the coast and Lake Volta. Hotel development geared towards leisure tourism can be expected to manifest in some of the more appealing coastal and forestry areas as well as along Lake Volta and the Volta River.
The strategic and catalytic projects which relate to the rural areas (refer to the figure below) include:

- The proposed market towns and tertiary nodes (Ga South):
  - Agricultural sector, services sector and industrial sector investment opportunities.
- The proposed new airport:
  - All urban services and airport related investment opportunities.
- Shai Hills:
  - Tourism, recreation and conservation related investment opportunities.
- Volta Estuary and the coastal area east of and including New Ningo:
  - Tourism, fishing, conservation and services related investment opportunities.

![Figure 7.4: GAR Primary Investment Opportunities - Rural Component](image-url)

In addition a thematic Investment Opportunities Plan is included in **Appendix B**.

(c) Settlement Hierarchy

Rural settlements abound in the region though without an evident structure, hierarchy or locational guidelines. They develop at random; probably start where chieftains grant permission for settlement, tend to locate on regional trunk routes and / or at intersections, have no distinct order and have little sign of formal planning. Therefore the SDC proposed creating a rural settlement hierarchy.

The settlement hierarchy is an inclusive approach and does not only deal with the size of a settlement. It concerns itself with all elements relevant to it, viz. social services, engineering services, access, location, size, function, etc. The intention is to create sustainable
settlements, prioritise and deliver social services, prioritise and have standards for engineering services, protect the rural environment, improve regional mobility and facilitate rural functionality at a regional scale.

Informed by Ghana’s Planning Standards three levels of rural settlements will constitute the rural settlement hierarchy. These are Grade 3, Grade 4 and Grade 5 settlements, though some adjustments are proposed.

The guidelines for the different settlements are set out below.

(i) **Grade 3 Settlement – Market Town**

**Focus:** To provide accessible urban services and to absorb localised urbanisation. Its criteria are:

- Broadly accommodates 40 000 people;
- Catchment area of ±320km² with a 10km radius;
- As a ball park should provide:
  - 2 secondary high schools
  - 4 junior high schools
  - 8 primary schools
- All residential rural growth should be channelled into the Grade 3 settlements;
- Have planned settlement form;
- Formal internal road network;
- Urban-level engineering services;
- Settlements to be removed from 1st and 2nd order roads (trunk routs to bypass settlement by 500m);
- Access to regional routes by way of controlled intersection and access road only (no direct site access onto trunk routes); and
- Administrative functions.

The criteria suggest that a Grade 3 settlement has an urban composition and character, yet, it is designated as rural, because of its contextual location. Indeed it will act as a necessary transition between the rural landscape and the urban conglomeration.

Eight (8) Grade 3 settlements have been identified in the Rural SDF, these are:

- Ada Foah
- Kesse
- Sege
- Dawsie
- Old Ningo
- Lanwa
• Dodowa
• Agamede

In terms of the NSDF’s proposed urban settlement hierarchy it can be expected in the future that the Ada Foah / Kesse urban complex could become a “major town” in the GAR (see Table 3.2 and Section 3.4.5 of the NSDF Volume II) with an urban population of between 50 000-100 000 people. The basis for such a major town is likely to be developed on a strong tourism and fishing industry together with supporting social and commercial services and small-scale industries.

Market Towns are expected to provide the full spectrum of urban services, including economic, social, engineering and administrative. The towns should meet the primary and secondary needs of the community necessitating commute to the urban centres only to access tertiary and high value goods and services.

Grade 4 and 5 settlements differ from a Grade 3 settlement in that they are truly rural with minimal and only rudimentary services. The growth of these areas should be minimised in view of their limited role and function.

(ii) Grade 4 Settlement – Rural Service Centre

Focus: To provide basic social and economic services at a reasonable level of accessibility. Its criteria are:
• Broadly accommodates 5 000-10 000 people;
• Catchment area of ±78km² within a 5km radius;
• As a ball park should provide:
  - no secondary high schools
  - 1 junior high school
  - 2 primary schools
• Growth only permitted based on improved economic base;
• Rudimentary spatial form (improve existing form where possible);
• Rudimentary road network (combined gravel and surfaced roads);
• Limited formal engineering services if any (not a service priority area);
• Settlement to be removed from 1st and 2nd order roads (trunk routs to bypass settlement by 500m); and
• Access to regional routes by way of controlled intersection and access road only (no direct site access onto trunk routes).

(iii) Grade 5 Settlement – Agricultural Village

Focus: Subsistence farming dormitory. Its criteria are:
• Broadly accommodates 2 500-5 000 people;
• Localised residential village;
• Serves farming community;
• Mostly subsistence based;
• As a ball park should provide:
  - no junior high schools
  - 1 primary school
• No growth permitted, any growth to be transferred to Grade 3 settlement;
• Rudimentary spatial form if any;
• Rudimentary road network (gravel roads);
• No formal engineering services;
• Settlement to be removed from 1st and 2nd order roads (trunk routes to bypass settlement by 500m); and
• Access to regional routes by way of controlled intersection and access road only (no direct site access onto trunk routes).

A thematic plan showing the nodal influence areas is included as Appendix C.

(d) Tourism

Tourism is a quaternary sector with activities that are embedded across a range of other definable economic sectors, mainly catering and accommodation. As such tourism is an amalgam of visitors’ consumption of goods and services including various modes of transport, accommodation establishments, food and beverage outlets, recreation and entertainment attractions, travel and tour operations, and souvenir traders. Further distinction can be drawn between leisure, business and health care tourism. Globally tourism is becoming a sustainable pillar of productive national revenue, decent employment and poverty reduction. This sector offers significant scope on account of differentiated product demand across widely diverging tourist market segments. The figure below provides a graphic demonstration of the activities involved within the tourism cluster. In this context, a broad spectrum of untapped opportunities exists within the as yet unexploited rural tourism sector of the GAR.
The areas most suited for tourism development include:

- New Ningo, Old Ningo, along the coast from New Ningo to Omankope;
- Ada Foah Village complex at the Volta Estuary (and linkages to the nearby Keta Lagoon protected area);
- Shai Hills and Songor Lagoon Protected Area;
- Densu Delta Protected Area;
- Lake Kokrobite; and
- Promoting business and medical tourism in the university and hospital precinct.

As mentioned, there are areas for potential tourism through the presence of reserves and other natural areas in the rural context (i.e. Shai Hills and the Songor Lagoon). Programmes for their development as tourism destinations should be established and the programmes should include plans to rehabilitate the hydrological systems as well as degraded biodiversity to enable tourism to take hold. Appropriate eco-tourism infrastructure must be developed so that the areas are not further degraded during the establishment of tourism.

(e) North-Western Rural Quadrant

As shown in the RSDF plan the rural area is by and large located to the east of the GAR. Yet, there is a small area encased in the west, referred to as the north-western rural quadrant. It covers approximately 70% of Ga South and though rural, generally already has a higher
settlement density than the eastern rural region. Nonetheless, it is rural and forms part of the rural hinterland.

This being said the area will experience pressure from the urbanised complexes of Accra and Kasoa. However, the quadrant is not in the desirable growth path of managed urban development and should therefore be protected from infill, development and densification. Accordingly, there is no need for a market town (Grade 3 settlement) and being near Accra and Kasoa will have access to primary, secondary and tertiary services. At most a secondary service node could be developed near Anuman which would put high quality secondary services within a 5km radius of the rural populace. Over the long-term it is foreseen that the area could develop as a higher income low-density residential enclave with intensive small-scale food production, urban recreation and tourism facilities.

7.2.3 Principle Land Uses

The RSDF plan displays the proposed settlement hierarchy but owing to scale does not show the suggested principle land use composition of each settlement (existing and proposed). Instead a principle land use allocation table (see below), derived from Ghana’s Planning Standards, was compiled listing the proposed principle land use mix for each settlement category.

Table 7.3: Land Use Allocation per Rural Settlement Category

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Sub-Category</th>
<th>Grade 3 – Market Town 40 000 people</th>
<th>Grade 4 – Rural Service Centre 10 000 people</th>
<th>Grade 5 – Agricultural Village 5 000 people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Primary school</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Jnr. High school</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Snr. High school</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Training school</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Health</td>
<td>Urban health centre</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Health centre</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Recreation</td>
<td>Active recreation</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sports field</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Market</td>
<td>Local Market</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Neighbourhood centre</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

Commercial (office, industry and business) land uses are difficult to quantify for their development and provision depends on the private market and is not the responsibility of government as are the uses contained in the table above. While Grade 4 and 5 settlements will have limited retail and business uses, Grade 3 settlements should have notably more.
A Grade 3 settlement should have small-scale support industry related to agricultural production, fishing and mining, retail industry focused on consumer goods and limited but basic speciality goods, tertiary services such as lawyers, doctors, banking, pharmacists, and given that tourism should be promoted some hospitality industry activity. It would also have some administrative functions being rural district capitals.

Grade 4 settlements will only have primary consumer retail of essential goods and very limited social services.

Grade 5 settlements will probably only have a single informal food market and at most one primary school. For all other services residents will need to access a higher grade settlement.

### 7.2.4 Rural Social and Retail Requirements

The following table is based Ghana’s Zoning Guidelines and Planning Standards (Ministry of Environment Science and Technology Town and Country Planning Department) and should serve as a guideline for social and retail services in the rural area. It is indicative of the additional social and retail services demand over the next 20 years to cater for an additional 340 806 rural people.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Standard 1 facility per x number of people</th>
<th>Area Allocation (Hectares per facility)</th>
<th>Requirement for the additional future rural population*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursery</td>
<td>2 000</td>
<td>0.5 - 1.0 Ha</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td>Primary School</td>
<td>5 000</td>
<td>1.21 Ha</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Junior Secondary School</td>
<td>10 000</td>
<td>1.62 - 2.4 Ha</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Senior Secondary School</td>
<td>20 000</td>
<td>1.62 - 4.05 Ha</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Training School</td>
<td>50 000</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td>Regional Hospital</td>
<td>1 000 000</td>
<td>15 Ha (max)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>District Gen. Hospital</td>
<td>200 000</td>
<td>10 Ha (max)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Urban Health Centre</td>
<td>40 000</td>
<td>5 Ha (max)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Health Centre</td>
<td>25 000</td>
<td>1.5 Ha (max)</td>
<td>14</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>Police Station</td>
<td>100 00 – 150 000</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fire Station</td>
<td>200 000</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Markets &amp; Shops</strong> (Retail)</td>
<td>Local Market</td>
<td>30 000 persons</td>
<td>3 Ha (max)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Neighbourhood Centre</td>
<td>5 000 to 15 000 persons</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Large Commercial Complex</td>
<td>500 000</td>
<td>3 Ha (min)</td>
<td>1</td>
</tr>
<tr>
<td>Category</td>
<td>Sub-Category</td>
<td>Standard 1 facility per x number of people</td>
<td>Area Allocation (Hectares per facility)</td>
<td>Requirement for the additional future rural population*</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------</td>
<td>-------------------------------------------</td>
<td>----------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Local shops</td>
<td>500 persons (max)</td>
<td><strong>0.1 Ha (min)</strong></td>
<td>682</td>
</tr>
<tr>
<td>Passive Rec.</td>
<td>Public Open Space</td>
<td>2 500</td>
<td><strong>0.3</strong></td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>Durbar</td>
<td>35 000</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Open Space</td>
<td>10% of development area</td>
<td><strong>0.3</strong></td>
<td></td>
</tr>
<tr>
<td>Active Rec.</td>
<td>Active recreation</td>
<td>35 000</td>
<td><strong>5.0</strong></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Local field sport facilities</td>
<td>5 000</td>
<td>-</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>National sports complex</td>
<td>9 887 131</td>
<td><strong>0.1</strong></td>
<td>in urban area</td>
</tr>
</tbody>
</table>

* Additional future rural population by 2037 will be 340 806.


### 7.2.5 Rural Connectivity and Transportation Network

Refer to Plan 7.2 on the following page.

**Plan 7.2: GAR Spatial Development Framework**

The rural component of the RSDF proposes a basic transportation grid over the entire region: a coarser and dispersed grid over the rural area; and concentrated and intricate grid over the urban area. Detailed transportation proposals have been prepared, the bulk of which are contained under the urban component of the RSDF (refer to Section 7.3.4). Below follows the transportation content applicable to the rural component which also makes reference to **Plan 7.5: Road Network Proposals** contained under Section 7.3.4 in the report. In addition a thematic Public Transport Plan and thematic Roads Plan are included in **Appendix D**.

(a) **Road Classification**

The road proposals include the establishment of a functional road hierarchy. The table below contains an outline of the roads applicable to the rural area.

<table>
<thead>
<tr>
<th>Class</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Metropolitan Express Way</td>
<td>- Carries high speed traffic on a metropolitan-wide scale.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Operating speed 100-120km/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Connects major regional activity nodes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Minimum speeds apply (60km/h)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The only access to the facility is by means of grade-separated interchanges.</td>
</tr>
<tr>
<td>Class</td>
<td>Type</td>
<td>Function</td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
|       |            | - Interchange spacing can be relaxed to a minimum of 1.5km.  
- No pedestrians or animals are permitted within the road reserve.  
- No stopping/parking next to the travelled way is permitted.  
- Incident management responds promptly to accidents and breakdowns to clear the road.  
- Vehicles using the road are predominantly cars, freight vehicles, long distance buses, express shuttles and minibuses.  
- Non-motorised vehicles are not permitted. |
| 2A    | Major Arterial | - Carries longer distance intra-city traffic at reasonable speed.  
- Operating speed 70 - 90km/h  
- Access is via at-grade signalized intersections or grade-separated when the traffic volumes are very high.  
- No stopping/parking next to the travelled way is permitted.  
- Access spacing of intersections 600-1500m  
- Access is strictly controlled, to very large developments only  
- Carry the bulk of commuter, business, commercial and freight traffic in an area |
| 3A    | Minor Arterial | - Distributes traffic within a district comprising a number of suburbs/townships.  
- The last leg of longer distance journeys.  
- Operating speeds of 50-70km/h.  
- Lower level of mobility.  
- Access provided to limited number of large developments that warrant installation of a traffic signal.  
- No on-street parking/loading.  
- Generally signalized access. Medium sized roundabouts can be considered. |

(b) **Road Network Proposal**

Rural transportation is primarily concerned with the regional movement of freight and people to other regions and countries. To achieve effective mobility the roads must be kept free of congestion and obstructions. Anything that hinders the free flow of regional traffic is deemed an interference and should be eliminated. Its relevance relates back to the region’s economic competitiveness and ability to grow its cargo, industry and tourism sectors.
The primary routes affected by the RSDF are the N1, N2 and R42. These are priority regional corridors which have to be de-clogged to increase the region’s economic advantage.

The road network proposals include the following:

- **N1 (Rural Areas)**
  Mobility be improved and protected on the N1 by:
  - Converting this section to a Class 1A Road;
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Removing all traders from the reserve;
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking; and
  - Upgrading road from 1 to 2 lanes per direction.

- **N2 (Rural Areas – northern extension)**
  Mobility be improved and protected on the N1 by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Removing all traders from the reserve;
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking; and
  - Upgrading road from 1 to 2 lanes per direction.

- **N4 (Rural Areas – Northern Extension):**
  Mobility be improved and protected on the N1 by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking; and
  - Upgrading road from 1 to 2 lanes per direction.

- **N6 (Rural Areas – Northern Extension):**
  Mobility be improved and protected on the N1 by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking; and
  - Upgrading road from 1 to 2 lanes per direction.
management);
- Removing access to properties except major developments;
- Preventing any trading in the road reserve or intersections;
- Relocating bus and tro-tro stops to be separated from the road;
- Removing on-street parking; and
- Upgrading road from 1 to 2 lanes per direction.

• **R40 Rural Areas**
  Mobility be improved and protected by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Relocating of bus and tro-tro stops to be separated from the road;
  - Removing on-street parking; and
  - Upgrading road from 1 to 2 lanes per direction.

• **New East-Trans African Highway:**
  - To be provided as a Class 1 road;
  - To be planned and reserved as a 3-lane per direction road;
  - To eventually be the East-West Trans African Highway; and
  - On the East, diverting from the N1 just west of the Volta River crossing.

• **Provision of Class 2 and 3 supporting network**
  - A supporting road network is proposed which should be provided on Class 2 and 3 standards. The purpose of this network is to provide access to the higher order roads which feed from various developments. In the rural areas these are the major roads linking the villages and secondary nodes.

(c) **Road Proposals in and around Rural Settlements**

(i) **Rural Settlement Access:**
  - All rural settlements (Grade 3, Grade 4 and Grade 5) should NOT have direct access onto 1st and 2nd order roads. As illustrated in the figure below regional routes should be re-routed around existing settlements providing a 500m buffer zone and one or at most two access roads onto the trunk route. The added benefit is improved safety and less intrusion for the rural community.
(ii) Rural Settlement Roads:

- **Grade 3 Settlement**: ideally all roads should be surfaced though it is accepted that minor roads would in all likelihood be gravel. A proper road hierarchy should be planned for.

- **Grade 4 Settlement**: main roads should ideally be surfaced, side and minor roads can be gravel. It will be acceptable for the village to have a mixed road composition (surfaced and gravel) though the majority would be gravel.

- **Grade 5 Settlement**: all roads will be gravel.

(d) Rural Bus Service

An extended daily bus service should be developed and implemented to include at least the primary and secondary road network in the region. Such a service will provide public transport to the rural populace and will increase connectivity between the urban and rural components of the region affording rural access to market towns and all its social and commercial facilities and services. It will effectively improve accessibility, connectivity and mobility.

(e) Maritime Infrastructure

(i) Fishing Ports

The region has an extensive shore line and fishing fulfils a vital role in the localised economies of seaside villages. Fishing and tourism compete for space along the shore line and appropriate planning should provide for growth and development of both sectors in a constructive manner. Careful consideration should be given to the livelihood of both sectors as fishing and tourism (in particular international tourism) can operate in relative close proximity, but are not perfectly compatible. Approximately 42 localised fishing ports are situated along the shore line, interspersed with swimming beaches and holiday resorts.
Precinct plans should be compiled for these villages including inter alia:

- Provision of landing beaches / fishing harbours;
- Cold storage facilities at the landing sites;
- Processing facilities;
- A broad spectrum of maritime equipment, trade, maintenance, repairs and associated activities; and
- Infrastructure connectivity to consumer markets.

In addition, a programme to include artesian fishing into the formal fishing economy should be developed. Two areas have been identified as potential spaces for the formalisation of informal fishing as potential pilot projects within this programme. These areas include the Tema Port and James Town in Accra. This is based on the volume of artesian fisherman utilising these areas.

Refer to Plan 7.3 on the following page.

Plan 7.3: Fishing Ports

(f) Maritime Infrastructure

The GAR has lower importance for agriculture than the rest of Ghana, however 10% of the population in Greater Accra is actively involved in agriculture. Agriculture in the rural setting of the GAR is fairly informal and therefore, proposals for these areas should be aimed at ensuring that agriculture continues to contribute to both the livelihoods of communities and to the rural economy. The following programmes should be developed:

- **Sustainable Fishing and Farming Practices**: The hosting of programmes for fisherman and farmer education and small business development on how to reduce exploitation and destructive practices.
- **Sustainable Farming Programme**: A programme should be established to assist communities to undertake sustainable practises such as Climate Smart Agriculture.

7.2.6 Engineering Services

The approach to the delivery of engineering services in rural areas should be guided by the hierarchy of rural settlements.

Grade 3 settlements should have proper engineering infrastructure and sustainable service delivery, which for the most part do not exist presently. Future provision therefore entails retrofitting services. Grade 3 settlements should be developed in accordance with the full range of engineering services. Services should include piped water, appropriate sewerage disposal systems preferably waterborne, a road system where at least the main collectors are
surfaced, 24/7 power supply, proper stormwater drainage and suitable waste management. Until this can be achieved environmentally safe mechanisms should be employed to ensure safe and healthy disposal of all kinds of waste.

Appropriate levels of engineering services should serve Grade 4 and 5 settlements. Each should at least have an appropriate and reliant water supply system, safe sewerage disposal system, 24/7 power supply (to curb deforestation), at least constructed gravel roads. Waste management should be co-ordinated between villages within close proximity to one another and Grade 3 settlements should be aligned to absorb the additional waste in their landfill sites. All waste disposal should employ healthy and safe processes to protect residents and the environment and should ideally be dealt with at district level.
7.3 Urban Spatial Development Component

The discussion of all the elements which follows relates to the RSDF plan (i.e. Plan 7.2: GAR Spatial Development Framework). To improve readability of the urban detail the urban component has been extracted as shown on Plan 7.4.

Plan 7.4: Urban Component of the RSDF

The urban spatial development component provides a dedicated spatial development plan and guidelines for the urban region.

The development philosophy hinges on the following principles already alluded to in the beginning of the study. Here their outcome in respect of the urban region is defined:

- **Concentration** – to create a hierarchy of nodes, in which a hierarchy of mixed land uses, land use densities and levels of connectivity are defined, the aim being to improve urban efficiency and sustainability.

- **Conservation** – to define the boundary of urban development so as to protect rural and natural resources for the benefit of the entire region, and to protect natural resources within the urban area as green ‘lungs’ to give people access to the natural environment / recreation.

- **Good linkage** – to achieve the efficient, fast and effective movement of people, goods and services between nodes along a transportation grid of roads and rail by means of private and public mobility systems.

- **Sustainability** – to ensure that the urban environment is sustainably developed for many future generations through integrated planning and development.

This section deals with the urban component of the region and as a point of departure uses the main elements of the Spatial Development Concept to guide the planning proposals. These being a demarcated urban development area, a robust open space system, a strong hierarchical system of urban activity nodes, and a well-defined and efficient transport system in support of the urban land use pattern.

The urban component is defined within the proposed urban boundary and the land use proposals relate to the metro area within this boundary.

7.3.1 Urban Development Boundary

The Urban Development Boundary (UDB) as indicated in the aforementioned plan indicates the area within which urban development will occur over time. It does not suggest that urban development will occur on an ad hoc or in an uncontrolled manner within this boundary. In fact urban development should only be permitted within the context of sound planning principles and development guidelines which will prevent urban sprawl and low density dispersed urban development. It should also relate to a sound engineering service delivery strategy and the ability to maintain efficient engineering services. The protection of
the environment and the provision of sufficient transport networks should also be considered in the evaluation of future urban development. Rules and regulations to achieve sustainable growth should apply within the UDB.

(a) **Purpose of the UDB**

The purpose of the UDB is to create a permanent boundary for the region beyond which no further development will be allowed in order to achieve a sustainable compact urban region in the interest of all its citizens.

The following criteria were applied to determine the UDB:

- Protection of the natural environment;
- Protection of the agricultural resources;
- Present growth trends at a regional and local level;
- Creating a compact urban footprint;
- Allowance for realistic urban growth; and
- Reduction of peripheral urban growth.

Advantages associated with the delineation of a permanent UDB include:

- Certainty in the market place as well as all levels of government;
- More accurate growth management;
- Increase in land values – agricultural and urban land;
- Application of appropriate servicing standards;
- Improved sustainable long-term planning; and
- Protection of agricultural opportunities to achieve urban support.

In order to determine the UDB for the GAR, natural features and existing administrative boundaries were mostly used.

(b) **UDB Description**

The following describes the path that the UDB follows:

- The UDB stretches from the western boundary of Ga South from the coastline in a northerly direction to Lake Naye.
- It follows the southern and eastern boundaries of Lake Naye to the Densa River.
- It then follows the Densa River to where it crosses the Greater Accra boundary near Papase.
- The UDB follows the GAR boundary to the northern boundary of Kpone Katamanso.
- It then follows the Shai Osu Doku boundary to a point where it intersects the proposed outer ring-road / by-pass. It should be noted that although it is not ideal to have a road
as a boundary, there is a lack of natural boundaries, and the exact determination of such boundary should be clarified during further detailed planning.

- The UDB then follows the proposed road alignment to the N1 where it is then projected to the coastline west of New Ningo.

(c) UDB Area

The output of the proposed urban development boundary is as follows:

- The total area within the demarcated UDB is approximately 151 265 ha in extent.
- The present day average density between Accra and Tema is 115 people/ha.
- If this density is applied to the total area, a population of 17 395 475 people can be accommodated within this area.
- At present-day Accra densities, the urban area can accommodate a population of 22 689 750 people.
- Future planning will strive for higher densities and it is therefore safe to say that the urban area as demarcated by this boundary is sufficient to accommodate the population of Accra for many years to come, also considering future lower growth rates.

7.3.2 Proposed Urban Area

The premise of GAR’s urban development is to protect the natural open spaces, implement meaningful and supportive transport systems and have efficient land use distribution. Achieving this has to be based on sound projections, i.e. a sound understanding of what GAR’s future spatial need will be. A good plan and good ideas can only take a region so far, without clear land use / spatial provision the plan will be void of any impact or and improved future for the citizens.

Below follows a detail outline of and motivation for quantifying the future population, housing demand, land requirement, and infill and development areas.

(a) Urban Population

The size of the current and future population is the driver of where and what the development framework should achieve.

The total GAR population at present (2017) is 5 055 348 of which 4 704 054 people (93%) are classified as urban. The projected total population figure, 20 years hence, in 2037 is 9 887 131 people of which 9 195 031 (also 93%) will be urban (refer to Section 7.1.2).

The urban population will almost double from 4.7 million urban people in 2017 to 9.2 million urban people in 2037. This means an additional 4 490 977 people have to be planned and provided for over the next 20 years. This could mean: as many houses, businesses, cars, trotros, water, schools, clinics, etc. as there are now will be needed 20 years on, and in the
same time twice as much waste, sewage and pollution as there is now will be dumped into the environment.

All these people have to be accommodated and therefore the primary mandate of the urban development component is to plan for these people and all their requirements in a sustainable manner.

(b) Land Area

The urban area is defined by the urban boundary, which, by means of a defined line separates the urban and rural regions. The urban area measures 151 265 ha.

Presently there are 4 704 054 (urban) people living in an area of 151 265 ha. This equates to a density in 2017 of **31 people per hectare (p/ha)** over the entire urban expanse.

However, there are many open and undeveloped spaces in the urban region and so a generalised density of 31p/ha is not advisable across the board since it is far too low for acceptable urban development. Therefore to define the settlement densities the plan looked at Accra and Tema’s settlement density individually and collectively.

Accra CBD has a present density of 150p/ha. Applying this density at 5 people per dwelling unit (p/du) (which is rounded from the statistical 4.8p/du) produces an overall residential density of 30 dwelling units per hectare (du/ha) in Accra. Based on a density of 30du/ha and at 5p/du the existing urban area will be able to accommodate 22 689 750 people.

Considering that this density might be high, the collective density between Accra and Tema was applied. Collectively Accra and Tema have a gross density of 115p/ha. At 5p/du this equates to a general gross density of 23du/ha. Based on a density of 23du/ha and at 5p/du the proposed urban area could then accommodate **17 395 475 people**.

The projected growth up to **2037 is ± 9.2 million people** which is far below both models above. Thus at both densities the **demarcated urban boundary has sufficient space to accommodate the future population growth if a general density of 23 or 30 dwelling units per hectare is maintained**.

(c) Urban Economic Drivers / Indicators

It is noteworthy to consider that urban (and rural) economic growth drivers are contextualised by time and geographic realities. In the early establishment and growth phases cities face specific challenges concerning in-migration, population growth and associated demand for land. During these initial stages a single centralised business core might be positioned to cater to the daily needs of consumers.

Thereafter cities typically experience a high growth phase characterised by extreme pressures on the environment (in broad terms), including:
- Physical: land to accommodate growth and expansion.
- Economic: new nodes closer to the expanding consumer market to address the diminished capacity and accessibility of a single central core. Appropriate strategies are required to strike a balance between the protection of existing nodes (including redevelopment and densification) versus the need for new growth and expansion areas.
- Infrastructure: extensive public sector investment in bulk infrastructure is required to facilitate economic growth.
- Natural environment: urban growth and development invariably encroach on sensitive areas such as rivers, lagoons, mountains and forests. Overlap typically occurs between such valuable natural assets and the spatial distribution of mineral deposits and hence, mining activity. On account of the fundamentally incompatible nature of these uses proactive planning is required to ensure that sensitive and valuable natural assets are conserved for future generations.
- Financial: extensive public sector investment requires a sustainable and continuously expanding tax base. A formalised land system coupled with a sophisticated tax regime (including real estate rates and taxes) is required to create the necessary financial means that would enable government to implement sustained positive interventions.

The above challenges are accentuated by the fact that the metropolitan area has clearly entered an accelerated growth phase. Furthermore, a significant proportion of economic activity (as proxy, 73.4% of total employment is accounted for by informal sector employment) is accounted for by the informal sector and associated organic growth in informal sector activity. These realities introduce very specific challenges to urban economic growth and management as listed below:

- Historic congested CBD with aging real estate assets and diminished capacity to accommodate extensive new capital investment and similar diminished ability to effectively serve far outlying areas.
- Diminished capacity of natural environment to be leveraged as tourist attractions.
- Challenges to create effective linkages between dispersed geographic areas that accommodate different elements of the production value chains.
- The organic configuration of the urban environment hampers the development of effective spatial linkages between production centres.
- The current land tenure and associated tax system would influence the extent to which financial resources could be mustered to address these challenges.

Emerging market environments pose significant capital investment opportunities across a broad spectrum of sectors. The first signs of foreign direct investment can typically be observed, first and foremost, in resource based sectors (typically mineral extraction) followed by investment in commercial assets. Investment in industrial infrastructure and assets typically lags the curve and proves significantly more challenging to attract, compared with investment in service sector based activities. Hence, governments tend to resort to strategies that artificially incentivise industrial development, to varied levels of success.
In view of the above, an integrated system of planned and correlated interventions would be required to facilitate economic growth and expansion, including but not limited to the following:

(i) Economic Growth and Development Strategy
A comprehensive economic growth and development strategy is required to provide a detailed knowledge base, supplemented by appropriately sophisticated analytical instruments that would provide a framework for sustained, effective and facilitative economic interventions by various organs of state. The current structure of available data (in particular localised production statistics) is inadequate in facilitating an analysis of this nature. Detailed sectoral and sub-sectoral analyses are required to inform such a plan. Extensive primary research would have to be conducted to yield the required level of detail.

(ii) Regional Tourism Market Plan
A regional tourism market plan must be compiled, including the development of tourism and associated infrastructure across the spectrum of opportunities identified as part of the tourism cluster.

(iii) Industrial Development Strategy
Industrial development strategy needs to be compiled, similarly founded on comprehensively detailed sectoral and sub-sectoral analyses, supplemented with industrial cluster and associated value chain analyses.

(iv) Housing Growth and Densification Plan
Prepare a housing growth and densification plan, which would require a detailed investigation into existing housing typologies, growth dynamics and pressures of respectively urban and rural housing environments. The housing plan will require an in-depth understanding of localised land tenure realities coupled with cultural influences and expectations concerning housing needs and demands. The plan should seek to actively promote housing densification over time around strategically identified nodes. Concomitant public and private sector housing delivery mechanisms need to be identified to address the full spectrum of housing needs.

(v) Informal Sector Plan
An informal sector plan should be prepared, since informal sector activity is arguably the most dominant, prevalent and wide-spread economic activity in the GAR. Appropriate plans need to be put in place to ensure an increased conversion rate of informal localised business and micro-survivalist enterprises into formal, small and medium sized mainstream business enterprises. Such developments would generate appreciable economic and fiscal benefits, including tax base expansion.
(vi) Long Term Financial Plan and Medium Term Revenue and Expenditure Framework

A long-term financial plan and medium term revenue and expenditure framework is required to achieve sustained economic growth and concomitant infrastructure investment, which is prescribed by detailed and sophisticated local government budgeting process. Even in sophisticated economies these budgeting processes are quite often dictated (and occasionally derailed) by political agendas. A sophisticated system is required that would functionally integrate the outcomes of the above system of plans into a coherent, multi-year long-term municipal budget. Such a system would necessitate the compilation, not only of detailed departmental budgets and forecasts, but also equally sophisticated project prioritisation mechanisms, revenue growth forecasts, revenue source assessments, surplus/deficit analyses and forecasts, and debt analyses.

The GARSDF in the main provides for these economic activities through proposed CBD developments, activity nodes, corridors and dedicated land use proposals for industrial and mixed land use developments.

It is further recommended that the following focus areas be considered as catalytic and strategic opportunities to support the broader economic base as well as the concept of a compact city (refer to the figure below):

- Accra CBD and beachfront;
- Proposed secondary and tertiary nodes;
- Airport and its surrounds;
- The port and its hinterland including the proposed dry port (inland port); and
- Formalised informal trade markets as integral new development components.
In addition a thematic Investment Opportunities Plan is included in Appendix B

(d) Housing Need

The 2017 housing stock is 987,792 dwelling units, which accommodate a general household size of 4.8 people per dwelling unit. Rounded to 5p/du the 2037 housing demand will be 1,839 million dwelling units, which is almost double the current housing supply of 987,792 dwelling units. The housing need / demand for 2037 is therefore 851,214 units (say 851,000), which means an additional 851,000 units will have to be delivered by 2037.

(e) Land Requirement

While it has been determined that the urban boundary area can accommodate the growing population it must also be determined if there is sufficient land to meet the housing demand. Based on Accra’s density of 30du/ha the housing demand will require a total of 28,000 hectares of land.

If the collective density between Accra and Tema is applied, i.e. 23du/ha the total land requirements will be 37,000 hectares, or rounded to 40,000 hectares.

Thus, to make provision for the projected population growth and to provide sufficient space for all development, GAR will have to provide and develop 40,000 hectares of land over the next 20 years, which includes the development of 851,000 residential units.
(f) **Spatial Land Allocation**

The following spatial allocation of the main land use categories is a guide and relates in broad terms to the GARSDF plan. The table pertains to the land use distribution over 40 000 ha.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>% of Total</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks, open space and sports fields</td>
<td>15</td>
<td>6 000</td>
</tr>
<tr>
<td>Residential</td>
<td>40</td>
<td>16 000</td>
</tr>
<tr>
<td>Roads and Infrastructure</td>
<td>15</td>
<td>6 000</td>
</tr>
<tr>
<td>State (defense, harbour, airport, etc.)</td>
<td>15</td>
<td>6 000</td>
</tr>
<tr>
<td>Industrial</td>
<td>10</td>
<td>4 000</td>
</tr>
<tr>
<td>Retail and Offices</td>
<td>5</td>
<td>2 000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>40 000</strong></td>
</tr>
</tbody>
</table>

*Source: U-Space ex.*

The above guide can also be used to determine the land use mix in mixed use land development areas, such as the existing and proposed nodes and corridors.

7.3.3 **Land Use Plan**

**Plan 7.4** shows the proposed land use distribution over the urban component at a regional level. The individual components are discussed to below.

(a) **Open Space**

The open space system for the urban area is based on key environmental criteria which include the following:

- Forest reserves;
- Protected areas;
- Forestry or game reserve purposes;
- Drainage lines / wetlands / water bodies / salt flats;
- Proposed greenbelt;
- Highly suitable agricultural zones;
- Riverine vegetation / riverine vegetation with / without scattered farms;
- Reserved shrub-thicket / reserved mosaic of thickets and grassland;
- Beaches; and
- Developed areas (to ensure accuracy of the open space system).

The open space system in the metropolitan area is therefore based broadly on the natural elements that should be protected and is mainly linked to the water courses and sensitive
areas as indicated on the Environmental Constraints Plan. The open space areas are either linked to form strips of green space on the UDB or pockets of green areas within the UDB.

This open space system forms a framework to guide further detailed planning in the Structure Planning phase of the urban planning process. This means that planning of parks and other natural areas as well as sport facilities at a local level should integrate with the wider open space system so as to create the envisioned well-protected and efficiently utilised system, which is highly accessible and to the advantage of all citizens.

The coastline should be considered an integral part of the above open space system and should be protected as such. The development of this valuable resource should take place within strict environmental guidelines to maximise its potential within the city.

Agricultural activity within the urban areas should be preserved as such and could become an integrated element of the overall open space system.

In support of this refer to Appendix A which contains a thematic Natural Open Space Plan.

(b) Hierarchy of Nodes

Rapid urban growth introduces numerous challenges, including traffic congestion, loss of open space and delayed service delivery not on par with population growth. These and other growth-related challenges are not only a threat to quality of life, but also to attracting business and investment. To manage population growth and development the objective of the GARSDF is to develop a nodal structure or hierarchy for the region as it will assist in:

- Preventing costly and environmentally damaging sprawl;
- Protecting rural / agricultural areas;
- Reducing municipal servicing costs; and
- Improving regional transportation options and connections.

The benefits of creating a nodal hierarchy include the following:

- **Community benefits:** Nodal development encourages people to walk by placing work, shopping, services and housing in close proximity to each other.

- **Environmental benefits:** Nodal development is compact, and as a result reduces sprawl and traffic congestion while preserving open spaces and environmentally sensitive areas. Natural features can be integrated in nodal developments and used as recreation areas or greenways.

- **Agricultural benefits:** Compact development helps preserve important agricultural land. Furthermore, it reduces development pressure on agricultural land and assists in maintaining local food security.

- **Public health benefits:** With the close proximity of shops, services, social facilities and housing nodal development makes non-motorised transportation (i.e. walking and
cycling) possible for a broader range of the community. This reduces vehicle trips, which in turn reduces pollution.

- **Economic benefits:** By concentrating growth in areas that are already serviced with the necessary bulk infrastructure (i.e. water, sewer and electricity) infrastructure servicing costs will be reduced. For businesses, compact mixed-use developments in close proximity to residential areas have been shown to attract more people and more shoppers.

  

### (i) Primary Nodes / CBDs

Primary nodes are those nodes which provide the highest residential and commercial densities and the greatest variety of services in the region. The primary node for GAR is the CBD of Accra. This node is where higher order land uses are within easy reach of the majority of the population and where the maximum flexibility as regards investment and land use restrictions should apply. As regional destinations primary nodes typically contain larger retail stores, entertainment, offices and a mix of higher density housing.

The following land uses should be supported in primary nodes:

- High density residential
- Primary and secondary education
- Tertiary education
- Medical
- Community facilities
- Micro enterprises
- Retail
- Office
- Entertainment
- Auto trade
- Business
- Light industrial
- Public open space
- Filling station
- Hospitality uses
- Home enterprises
- Personal service industry
- Service industry
- Sports stadiums and facilities

---

**Figure 7.8:** Visual Impression of a Primary Node

**Figure 7.9:** Beachfront Development Opportunity
• Taverns
• Municipal and government facilities
• Social services
• Logistics
• In the case of Accra, beachfront development

The primary node being Accra CBD has an urban area of influence of approximately 30km in radius. Accra node is the gateway to Ghana and provides higher order goods and facilities within relatively easy reach for the approximately 5 million urban people.

As indicated in the RSDF the CBD area for Accra is indicated as the area between Nkrumah Avenue, Ring Road Central and the coastline. It is suggested that the area between Ring Road Central, Nsawam Road, the N1 motorway, the airport bypass road and Cantonments Road be treated and developed as part of the metropolitan core in support of the CBD.

(ii) Secondary Nodes

Secondary nodes are intended to create a focus for more residential development and to provide a variety of services for local residents, including a mix of medium density housing, shopping, offices and personal services.

Land uses supported in secondary nodes are:
• Medium density residential
• High density residential
• Primary and secondary education
• Tertiary education
• Medical
• Community facilities
• Micro enterprises
• Retail
• Office
• Entertainment
• Public open space
• Filling station
• Hospitality uses
• Personal service industry
• Service industry

Figure 7.10: Visual Impression of a Secondary Node
• Taverns
• Municipal and government facilities
• Regional sport and entertainment facilities
• Social services

The secondary nodes as proposed include Tema and relate to major transport facilities and are generally speaking approximately 15km apart, or within 15km of the N1 motorway. These nodes are modelled on an area with a 2km radius (approximately 1.379ha) high density urban development and are meant to encompass sound urban development principles such as high density living, mixed land use development, walkability, connectivity and good accessibility to the remainder of the metropolitan area. The impact zone of such nodes will be approximately 10km radius.

The proposed nodes will not all develop at the same time or rate, but locational advantages related to these nodes should ensure long-term development and densification.

The following secondary nodes, in addition to Tema, have been identified:

• Ga South Node to the south of Lake Naye and the N1 motorway.
• Amasaman Node which includes the District Capital and the areas east of the N6 motorway.
• Madina Node which is strategically located between the N4 and R40 roads.
• Modol Node which is located in close proximity to the N2 motorway. This node is bound to serve the newer growth areas of the metropolitan area.
• Prampram North Node which is located towards the eastern periphery of the urban complex, to the north of the N1 and could well capture some of the potential development from the proposed new airport (should it materialise).

In locating the secondary nodes various options were considered and as such the Madina Node was relocated to the south of the Metropolitan Expressway in order to maximise the N4/R40 intersection as well as being closer to the university. Similarly Prampram North Node was relocated from north of the N1 to the south of it to achieve a more functional and compact city structure between Prampram and the proposed Prampram North Node.

(iii) **Tertiary Nodes**

Tertiary nodes are aimed at providing social and economic services at the suburban scale. The facilities should provide higher order services at a localised and accessible level. In most cases the district capitals could serve as catalysts for these nodes, or alternatively, these are earmarked at important intersections within the suburbs. The tertiary nodes are not aimed at the mainstream components of public transport, but rather at localised transport (informal and pedestrians).
Land uses supported in tertiary nodes include:

- Administrative offices and facilities
- Higher order social services, i.e. senior secondary schools, health clinics, police stations, etc.
- Convenience retail
- Limited office uses
- Higher density residential
- Sport and recreation facilities
- Financial services (banking)
- Personal services (beauty salons, laundry services, etc.)

- Where the location is favourable, transit oriented development could also be considered

The tertiary nodes as proposed are modelled on an area with a 1km radius and with social services and tertiary services as the main land use components. These nodes mainly relate to the intersections of prominent third order roads and will function at a suburban level. It is further proposed that these nodes also be central to localised densification and they could include transit oriented development, i.e. at points of modal integration or railway stations and even BRT stations.

In support of this section a thematic plan – Nodal Influence Areas Plan has been included in Appendix E.

(c) Corridors

Corridor development is an instrument to restructure the GAR into efficient and well-connected urban areas. This can be achieved through the following long-term strategic objectives:

- Promote densification in strategic locations;
- Ensure a clear structure for movement and accessibility, and ensure movement systems are directly linked with and supported by high-intensity, mixed-use nodes and higher residential areas;
- Encourage a compact city structure; and
- Ensure urban sprawl is prevented through the use and re-use of well-located land for housing development.
(i) Transport Corridors

The term corridor is used in many different ways but Kenneth A. Kriz (Transportation Corridor Planning: A Model and Case Studies, 2003. pg. 2) defines a transport corridor as “a geographic area between two points, linking multiple centres and moving people and freight” (emphasis added).

For the purposes of the GAR transport corridors are:

- High volume transport routes connecting major activity centres and nodes;
- Roads for inter-and intra-region heavy freight and through traffic;
- Roads to link and move people and goods from one place to another; and
- Roads to provide mobility rather than access.

The following transport corridor principles should guide planning initiatives:

- Connect and provide access to and between major centres of activity;
- Access points or interchanges should be positioned at well-spaced intervals to provide access to adjoining transportation systems;
- Develop compact, mixed use nodes at access points that support transit and active transportation;
- Identify areas of transformation or protection along the transport corridor;
- Land-use conversions be discouraged and the applicant/developer be encouraged to rather consider an existing node along the subject route for the proposed development; and
- Where high intensity land uses are permitted along the corridor implement access management measures.

The above-mentioned principles are illustrated in the following figure.
In order to create linkage and mobility on a metropolitan level the N1 and the proposed Metropolitan Express Way were identified as transport corridors. These corridors will not only connect areas of economic opportunity and of potential growth, but will also improve regional / inter-continental linkages.

(ii) Development Corridors

Where mobility is the defining factor for transport corridors, accessibility is the central factor for Development Corridors. Thus, a development corridor can be defined as an area of higher intensity land uses or land suitable for intensification, parallel to and on both sides of an activity spine or main arterial road.

Taking into consideration the built, natural and socio-economic environment of the GAR, there are three definite development corridors. These being the N6, Liberation Road Corridor Extension (N4) and N2.

The approach for development along these corridors is guided by the following principles:

- Provide public transport;
- Provide land use that optimises the investment in transit; and
- Provide public amenity and facilities to compliment intensity, land use mix and community activity.
A key element of the development corridor is intensification. A large portion of the GARs densification target is directed to nodes and development corridors and hence they should be supported by public transport, a diversity of housing types and living environments, reduced dependency on private motor vehicles and suitable liveable environments.

The development corridors will function as an integral part of the surrounding urban environment and will characterised by:

- Activity spines, nodes and activity streets to accommodate the accessibility need;
- A linear strip of land or area, connecting primary activity nodes;
- Traversing urban or inter-urban areas;
- Surrounding a major transport facility or facilities;
- Providing an appropriate regional level of mobility and accessibility to adjacent areas;
- A high concentration of population and mixed land-uses;
- Accommodate the bulk of public transport services and facilities to connect disadvantaged communities to areas of opportunity; and
- Parallel rear laneways and local streets (but not continuous along the length of the corridor) that provide for efficient vehicle access.

The three proposed development corridors should be planned and developed to:

- Support and facilitate development and investment that contribute to economic and social sustainability of the corridor and the broader urban environment; and
- Support a compact, mixed use urban environment that uses resources efficiently and sustainably.
(d) **Mixed Land Use**

Mixed-use development is the general term for a variety of complementary land uses located together, either horizontally or vertically. “Horizontal mixed-use” means residential and business uses are adjacent to each other. “Vertical mixed-use” means residential and commercial uses are stacked one on top of another. Typically, residential uses are placed over ground-floor retail, office and/or restaurant uses. By focusing development and redevelopment projects where land uses are more integrated, people are able to walk to school, shopping facilities and work. NMT then becomes a viable mode of transport, and it is clean, safe, healthy and free.

The benefits of mixed-use include:

- Efficient use of land resources (compact urban development);
- Creating a local sense of place;
- Taking advantage of opportunities for infill and redevelopment and development within higher order nodes;
- Creating areas that are active throughout the day;
- Increasing housing options for diverse household types;
- Reducing private vehicle dependence;
- Optimise infrastructure investment; and
- Increasing travel options.

Nodes are a primary spatial element that establish urban character and identity. The RSDF therefore supports the creation of more and a hierarchy of nodes and development corridors, which must include a mix of land uses to provide a sense of place, urban form and legibility.

Focusing mixed-use development at nodes and the development corridors will ensure:

- Planning is conducted in a structured and focused manner, enabling the setting of clear development goals linked to a specific geographical area; and
- Resources are focused within a specific area, thereby making it a focal area for providing for example social facilities such as schools and clinics.

Mixed land use applications can differ between locations: mixed land use in the secondary nodes will have a residential bias whereas in a development corridor it will have a commercial bias.

An important aspect about mixed land use application is not to neglect the provision of social services. Moreover it is important to realise that traditional social services standards may have to be adjusted to suit the higher density and more compact urban environment as associated with mixed land use zones / areas.
(e) **Industrial Development**

Industrial land use as indicated in the GARSDF includes heavy and light industries and can include logistics, warehousing and commercial (wholesale, car dealers, car servicing, and other) land uses.

The main industrial areas include:

- The main industrial zone in the south of Kpone Katamanso and east of Tema. This is the only area where noxious industry should be allowed, provided all environmental requirements can be met.
- The area west of the N6 and the Accra CBD. This area is well located but will need to be upgraded and improved to accommodate more light industrial, commercial and labour intensive activities.
- The N1 corridor between the N6 and the N2 at Tema has developed and can be developed further as a transport corridor which is flanked by industrial land use. The visual exposure offered by such transport corridor is especially attractive to lighter industrial and commercial land uses.
- The proposed major metropolitan express way to the north of the N1 should also be developed and designed to serve as a transport corridor with industrial land uses on both sides thereof.
- The proposed dry / inland port which is located north-east of the Modol Secondary Node and between the N1 and proposed Metropolitan Expressway will attract supporting industrial land uses and could be seen as a catalyst for the proposed node. The dry port is located along these important routes to also contribute to alleviating the heavy truck traffic movement in and around Tema.

The development focus in the existing industrial areas should be on operational maintenance, i.e. refuse removal, road maintenance, building maintenance and law enforcement. The industrial areas will remain important investment targets and employment providers, and should as such attract sufficient budgetary allocations.

(f) **Residential Development**

The GARSDF indicates “Urban” development land which primarily includes residential land but also includes the supporting land uses required for sustainable urban development, i.e. all social services, localised retail and economic services, sport and recreation facilities, etc.

In addition to above spatial allocations in existing and new urban areas, the following broad guidelines should be implemented:

- In line with the principles of pursuing a compact city with efficient public transport facilities the location of future housing projects should aim to support present and future activity nodes as well as rail and road based public transport. Peripheral development of low-density low-income housing should be avoided. In this regard
 integrated housing development should be pursued and opportunities investigated in previously considered derelict land and buildings.

- In areas earmarked as ‘precinct upgrade’ or ‘informal housing’ the focus should be on the provision of social and municipal infrastructure as well as the aesthetic upgrade of the area. Residential densities should be directed to support secondary and tertiary activity nodes and corridors without over-utilising existing service infrastructure.

- New housing projects for the lower income groups should not be marginalised and should be located on land which is accessible and in contact with economic and social facilities.

- In medium and high income areas focus should be on the maintenance of infrastructure of these areas. These areas should also be allowed to densify within the context of the urban scale and aesthetics of the area. The ability of existing infrastructure to accommodate densification must be predetermined.

- It is recommended that urban development not be promoted to the north of the proposed Metropolitan Expressway and that the areas earmarked as “urban development” which are located north of this Expressway be considered as longer term (beyond 20 years) development areas, and the provision of engineering services be delayed accordingly in these areas so as to not promote encroachment.

The projections indicate the need to deliver 851 000 residential units. The question then arises where should 851 000 units be located for sensible, sustainable and beneficial development. To achieve the desired urban structure the following allocations of residential units should serve as a guideline:

(i) **CBD**

The existing CBDs of Accra and Tema should be complimented by residential land uses since both, but particularly Accra should accommodate increased numbers of residential units at appropriate densities. This has an impact on land use mix and composition and the improved functioning of the core. The CBD should not be regarded as the core alone, but includes the support zones and so it has the ability to grow becoming larger than it currently is. It is deemed that Accra could easily accommodate 20 000 additional units and Tema 10 000 over the next 20 years. In total the CBDs should be able to absorb **30 000** dwelling units. The CBDs provide short-term opportunities in view of their existing structures.

(ii) **New Infill Areas**

The land use plan identifies new greenfields infill areas. In total the areas make up 10 000 hectares across the urban region. If only 50% (half), i.e. 5 000 hectares is developed over the next 20 years at 30du/ha then the infill areas can accommodate **150 000** dwelling units.

The location of these development opportunities are such that the future development will support public transport as well as a compact city.
(iii) Generalised Infill of Existing Areas

Generalised infill in existing brownfields areas will occur in the short term. It is estimated that at least 20% of the future housing demand will be absorbed by the existing settlement areas. If so then a total of **175 250 units will be absorbed in the existing fabric**.

(iv) Corridors and Tertiary Nodes

It is deemed that the development corridors and tertiary nodes would be able to accommodate 20% of the future housing demand. If so, then **a total of 175 250 units will be built in these new areas**.

This could also be promoted in the short term, since some of these nodes and corridors already exist.

(v) Secondary Nodes

The secondary nodes are major areas of intervention for GAR’s urban region. These are new nodes that must be planned and driven to achieve the desired development, densities and mixes. The planning and development guidelines for these nodes are discussed further in the document, but for the sake of quantifying housing delivery are assessed here.

The nodes will span a 2km-radius area, which constitutes a **12.5 km^2 / ≈ 1200 ha area**. In the node the highest residential density will be implemented. At 120du/ha gross each node should be **able to accommodate 144 000 dwelling units**. If translated to nett density the density works out to 300 du/ha which is entirely attainable.

There are five planned nodes. If each only develops half the housing stock it can deliver during the first 20 years, then all five together will be able to deliver **360 000 dwelling units**.

(vi) Total Housing Delivery

Adding the total housing delivery together for each of the five potential development areas, it transpires that at appropriate densities 880 550 dwelling units can be accommodated over the next 20 years. Noting also that the secondary nodes and proposed infill areas have only been calculated at 50% capacity.
Evidently, there can be an oversupply of approximately 30 000 dwelling units based on these projections.

The areas referred to above are shown in the figure below, which also suggests that development of the existing urban areas should be concentrated south of the proposed Metropolitan Expressway.

![Figure 7.15: Residential Allocation Zones](image)

Also refer to Section 7.4.2 for the density guidelines and Appendix F which contains a thematic Housing Allocation Plan.

(g) **Social Services**

The social services as required in GAR provide a clear indication of the broad land-use pattern to be developed to achieve sustainable spatial development. The GARSDF clearly provides...
spatial development guidance at the macro level while also providing sufficient flexibility to guide urban planning at the regional and local levels that will reflect the needs of the relevant area. Social services make up a large percentage of the “Urban” land as per the GARSDF.

The Zoning Guidelines and Planning Standards (Ministry of Environment Science and Technology, Town and Country Planning Department) set facility standards and although these standards do provide a measure of how many facilities are to be provided, they must not be interpreted as forming exclusive catchment areas.

These standards, specifically as regards the size of a facility, are generally very high and can easily be reduced through more effective use and sharing of space, for example, playing fields or parking areas. The reduction of space standards would lead to an increase in gross density, which is pursued to achieve sustainable development, social facilities could be integrated with other land uses, such as business uses if need be.

Public facilities should be clustered as far as possible. This has the advantages of:

- Convenience, as many services can be accessed in one trip.
- Reduction of costs, through the sharing of land, resources and equipment.
- Encouragement of use, as facilities are more likely to be used when clustered than when isolated.
- Greater safety, as facilities are likely to be used over a longer period.
- Larger catchment area, less susceptible to localised demographic changes.
- Integration of different communities, through the shared use of facilities.

Clustering can take the form of multi-purpose facility clusters, with a range of services and activities under one roof, or functional clusters grouped together, facilities that are related, such as education, whereby different schools can share sports and library facilities. Location of different facilities should consider generic locational criteria, such as:
- Public facilities, from which emergency vehicles are distributed, should be located on higher-order multifunctional routes that intersect with regional and primary distributors.

- Public facilities that need to be visible and accessible to the greatest number of people, but located in a safe, quiet environment, such as clinics, hospitals and libraries, require easy access to public transport stops and interchanges, but should be located a block or two back from intense activity routes.

- Public facilities that need to be accessible to pedestrians and that need safe and quiet surroundings, such as primary schools, should be located within the residential area within walking distance of homes.

- Public facilities that need to be as visible and as accessible to pedestrians as possible, such as post offices, should be located within walking distance of the user household on busier road intersections.

The following types of social services and their standards, as adapted to address the needs of the growing population, are discussed in more detail below:

- Educational facilities;
- Health facilities;
- Active and passive open space; and
- Retail / business facilities.

(i) Educational facilities

The provision of facilities at schools is often problematic because of a lack of funding. To reduce the financial burden on the provision of schools, shared sportsfields and the platoon system (where more than one school shares the same facilities at different times of the day) can be implemented. School facilities should be used for a broad range of education and training functions besides school education. Sites should therefore be accessible to the general public and safety of access routes at night should be considered.
### Table 7.7: Spatial Guidelines for Educational Facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th>Location</th>
<th>Access</th>
<th>Size and dimensions of site</th>
<th>Use capacity and thresholds</th>
<th>Cluster with</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursery</td>
<td>• Walking distance of households and within the centre of the community.</td>
<td>• Pedestrian pathway without having to cross major streets.</td>
<td>• Minimum plot size: 500m² up to 10 000m².</td>
<td>• Population to be served: 1 000 to 5 000</td>
<td>• Primary schools, community centres.</td>
</tr>
<tr>
<td></td>
<td>• Within neighbourhood shopping and marker areas.</td>
<td>• Maximum walking distance: 10 min walking distance from house</td>
<td>• 40 to 50 pupils per class.</td>
<td>• 1 per primary school.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• May be part of a primary school.</td>
<td></td>
<td>• 1.4m² to 1.8m² child, including outdoor space.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Away from undesirable land uses such as liquor outlets and taxi ranks.</td>
<td></td>
<td>• Minimum area per play lot: 20 - 30m².</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pedestrian pathway without having to cross major streets.</td>
<td></td>
<td>• 1/3 used for circulation, administration and ancillary uses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>• Within easy walking reach of every house.</td>
<td>• Accessible by foot, bicycle and vehicle.</td>
<td>• Population to be served: 1500 to 6 000 people;</td>
<td>• High school, nursery schools, community hall, playground, park</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Close to public transport route.</td>
<td>• Maximum walking distance: 1.25 - 2.5km</td>
<td>• Recommended enrolment: 650 pupils.</td>
<td>• 1 sports field with mini soccer field, 4 courts and change rooms per 3 primary schools (1.25 - 1.62ha).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Away from undesirable land uses such as liquor outlets and taxi ranks.</td>
<td></td>
<td>• Minimum lot size: 1,214 ha.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On relatively flat land, especially where sportsfields are provided.</td>
<td></td>
<td>• Dimensions: 45-65m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Avoid major routes as schools generate traffic congestion at certain</td>
<td></td>
<td>• 40 to 50 pupils / classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>times.</td>
<td></td>
<td>• Where a community sports facility is available, the site can</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Population to be served: 10 000 people</td>
<td></td>
<td>be reduced.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior Secondary School</td>
<td>• Between two neighbourhoods of up to 10 0000 people.</td>
<td>• Maximum walking distance: 3,2 km.</td>
<td>• Population to be served: 10 000 people</td>
<td>• 1 Community centre/library/hall including a resources centre, adult library, community offices and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Within easy pedestrian and vehicular access.</td>
<td></td>
<td>• Minimum size: 1,62ha to 2.43ha.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 40 to 45 students per classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Where a community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility</td>
<td>Location</td>
<td>Access</td>
<td>Size and dimensions of site</td>
<td>Use capacity and thresholds</td>
<td>Cluster with</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Senior Secondary school| • Between two and four neighbourhoods with a total population of 20 0000 people.  
• Within easy pedestrian and vehicular access.  
• Major transport route with public transport stops.  
• Away from undesirable land uses such as liquor outlets and taxi ranks.  
• On relatively flat land, especially where sports fields are provided.  
• Avoid major routes as schools generate traffic congestion at times. | • Maximum walking distance: 4 km.                                            | • Minimum size: 1,62ha to 4.05ha.  
• 30 to 35 students per classroom.  
• Where a community sports facility is available, site can be reduced to 1,2 ha. | • Population to be served: 20 000 people                                   | • 1 Community centre/library/hall including a resources centre, adult library, community offices and a performance/presentation hall per 4 schools (0.35-0.4ha). Location accessible by public transport and close to shops.  
• 1 Sports complex including athletics track, 2 full size sports fields, 6 courts, swimming pool and change rooms per 2 schools. |
The above standards will in most cases apply within the existing and brownfields urban environment. However, with a view to compacting the city through high-density mixed-use development it is recommended that the above standards be reviewed in the structure plan phase to be more suited to the intended compact city form.

(ii) Health Facilities

Health facilities form a hierarchical system, with lower order services acting as referral points. Higher order facilities can also accommodate lower order facilities. Some locational criteria are:

- Sites should be located on public transport routes and must be located on routes that link the different referral centres.
- Day clinics are used primarily by mothers and for convenience should be located close to shops and services.
- Potential disaster areas, such as flood plains, should be avoided as health services operate at full capacity during emergencies.
- Sites should allow for the entire complex to be single storey because of the extent of pram, wheelchair and trolley use and the limited mobility of many users.

Table 7.8: Spatial Guidelines for Health Facilities

<table>
<thead>
<tr>
<th>Types</th>
<th>Access</th>
<th>Size and Dimensions</th>
<th>Use Capacity and Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic</td>
<td>Accessible on foot.</td>
<td>Max: 0.5 ha</td>
<td>Population to be served: Max 5 000 people</td>
</tr>
<tr>
<td></td>
<td>Maximum walking distance: 1km.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum travel time: 20 min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Post</td>
<td>Accessible on foot.</td>
<td>Max: 0.5 ha</td>
<td>Population to be served: Max 5 000 people</td>
</tr>
<tr>
<td></td>
<td>Maximum walking distance: 1km.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum travel time: 20 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Centre</td>
<td>Accessible on foot.</td>
<td>Min: 1.5 ha</td>
<td>Population to be served: 5 000 to 25 000 people</td>
</tr>
<tr>
<td></td>
<td>Maximum walking distance: 1km.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum travel time: 20 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban Health Care or Polyclinic</td>
<td>Maximum walking distance: 2km.</td>
<td>Min: 5 ha</td>
<td>Population to be served: 30 000 to 50 000 people</td>
</tr>
<tr>
<td></td>
<td>Maximum travel time: 30 minutes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 minutes walking time from public transport.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>District General Hospital</td>
<td>Maximum travel distance: 3km</td>
<td>Min: 10.0 ha</td>
<td>Population to be served: 80 000 to 200 000 people</td>
</tr>
<tr>
<td></td>
<td>Maximum travel time: 40min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Hospital</td>
<td>Maximum travel distance: 5km</td>
<td>Min: 15.0 ha</td>
<td>Population to be served: 600 000 to 1 000 000 people</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The above standards will generally apply within the existing and brownfields urban environment. However, with a view to compacting the city through high-density mixed-use development it is recommended that the above standards be reviewed in the structure plan phase to be more suited to the intended compact city form.

(iii) Social Service Delivery Standards

Social services should be provided by governmental or private organisations. These public services aim to create more effective organisations, build stronger communities and promote equity and opportunity. The standards relating to social services (as adapted) are explained in the table below (read with Table 7.7 and Table 7.8).

The standards should serve as a guideline in conjunction with existing standards and policies. The standards have been adjusted in the spirit of a new city structure and to achieve a more functional compact form.

### Table 7.9: Urban Social and Retail Requirements

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Standard 1 facility per x number of people</th>
<th>Area Allocation (Hectares per facility)</th>
<th>Requirement for the additional future urban population*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td>Nursery</td>
<td>2 000</td>
<td>0.5 - 1.0 Ha</td>
<td>2245</td>
</tr>
<tr>
<td></td>
<td>Primary School</td>
<td>5 000</td>
<td>1.21 Ha</td>
<td>898</td>
</tr>
<tr>
<td></td>
<td>Junior Secondary School</td>
<td>10 000</td>
<td>1.62 - 2.4 Ha</td>
<td>449</td>
</tr>
<tr>
<td></td>
<td>Senior Secondary School</td>
<td>20 000</td>
<td>1.62 - 4.05 Ha</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>Training School</td>
<td>50 000</td>
<td>-</td>
<td>90</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td>Regional Hospital</td>
<td>1 000 000</td>
<td>15 Ha (max)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>District Gen. Hospital</td>
<td>200 000</td>
<td>10 Ha (max)</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Urban Health Centre</td>
<td>40 000</td>
<td>5 Ha (max)</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>Health Centre</td>
<td>25 000</td>
<td>1.5 Ha (max)</td>
<td>180</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>Police Station</td>
<td>100 000 – 150 000</td>
<td>0.5</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Fire Station</td>
<td>200 000</td>
<td>0.5</td>
<td>22</td>
</tr>
<tr>
<td><strong>Markets &amp; Shops</strong></td>
<td>Local Market</td>
<td>30 000 persons</td>
<td>3 Ha (max)</td>
<td>150</td>
</tr>
<tr>
<td><strong>(Retail)</strong></td>
<td>Neighbourhood Centre</td>
<td>5 000 to 15 000 persons</td>
<td></td>
<td>299</td>
</tr>
<tr>
<td></td>
<td>Large Commercial Complex</td>
<td>500 000</td>
<td>3 Ha (min)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Local shops</td>
<td>500 persons (max)</td>
<td>0.1 Ha (min)</td>
<td>8900</td>
</tr>
<tr>
<td><strong>Passive</strong></td>
<td>Public Open Space</td>
<td>2 500</td>
<td>0.3</td>
<td>1796</td>
</tr>
<tr>
<td>Category</td>
<td>Sub-Category</td>
<td>Standard 1 facility per x number of people</td>
<td>Area Allocation (Hectares per facility)</td>
<td>Requirement for the additional future urban population*</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------</td>
<td>--------------------------------------------</td>
<td>----------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Recreation</td>
<td>Durbar</td>
<td>35 000</td>
<td>-</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td>Open Space</td>
<td>10% of development area</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>Active recreation</td>
<td>35 000</td>
<td>5.0</td>
<td>128</td>
</tr>
<tr>
<td>Recreation</td>
<td>Local field sport facilities</td>
<td>5 000</td>
<td>-</td>
<td>898</td>
</tr>
<tr>
<td></td>
<td>National sports complex</td>
<td>9 887 131</td>
<td>0.1</td>
<td>1</td>
</tr>
</tbody>
</table>

* Additional future urban population by 2037 will be 4 490 977

(iv) Safety and Security

The design of new residential areas should consider safety measures in accordance with the principle of “eyes on street” pertaining to public areas, rather than creating secluded and deserted areas. Another factor to consider is the perceived security risk associated with open space and how it should be approached.

(v) Emergency Services

These sites should be located on higher-order multifunctional routes that intersect with regional and primary distributors.
7.3.4 Urban Connectivity and Transportation Network

Plan 7.5 and Plan 7.6 support the discussion that follows.

**Plan 7.5: Road Network Proposals**
**Plan 7.6: Strategic Public Transport Network**

In addition a thematic Public Transport Plan and thematic Roads Plan are included in Appendix D.

Increased mobility, economic growth, higher levels of private vehicle ownership and environmental deterioration impose increasing demands for innovative transportation solutions. Management and development of an integrated transport system is aimed at integrating spatial development, improved mobility, stimulating economic growth, increased efficiency and safety, and appropriate management of the environment.

The transportation system proposals together with spatial planning proposals, will provide strategic structure to the city. The proposals must further be used to protect land earmarked for the future transport system.

Past transport policies implemented by global cities focused on building roads to meet the demand of the motor vehicle users. However, recent 21st Century transport policies focus on establishing “human-orientated eco-friendly transport systems”, with more emphasis on public transport and acknowledging the role of walkability and non-motorised methods of mobility.

Although this is the direction in which Ghana should go, the current congestion levels warrant the need to provide new major roads and upgrading of existing ones.

**(a) The Road Network**

Road transport represents 95% of all movement of people and freight in Ghana. Though acknowledging the need for public transport and establishment of human-orientated eco-friendly transport systems, the capacity of the GAR road network is inefficient to fulfil the traffic demand needs within the region. The lack of a functional road classification worsens the situation. The integrated road network plan was prepared to support the proposed Spatial Development Framework.

**(i) Road Classification**

A functional road hierarchy is the classification of roads according to the type of service they are intended to provide.

The type of service is essentially characterised by the level of access and the level of mobility that a road must offer. It is important to note the trade-off between access and mobility;
whereby the highest mobility roads provide minimal access (Class 1 - freeway) and the highest access routes (Class 5 - local access way) provide very low mobility. This concept is graphically illustrated in the figure that follows.

![Functional Classification](image)

Figure 7.18: Access versus Mobility in Functional Road Hierarchy

Typical examples of Class 1 and 2 roads are shown below. Note the absence of access to adjacent properties.

![Class 1 Road](image)

Figure 7.19: Class 1 Road: Regional Freeway with Grade Separation Access Only
Note that the class of road as proposed is not associated with who owns, builds or maintains the road but instead relates to its functionality pertaining to level of access, speed of travel, purpose, design standards, etc.

The functional descriptions for the urban road classes 1, 2 and 3 are presented below.
### Table 7.10: Functional Description per Class of Road (Urban)

<table>
<thead>
<tr>
<th>Class</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regional Freeway</td>
<td>• Carries primarily inter-city, regional and longer distance metropolitan traffic at high speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operating speed is 120km/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum speeds apply (60km/h).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The only access to the facility is by means of grade-separated interchanges spaced a minimum of 4km apart.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No pedestrians or animals are permitted within the road reserve.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No stopping/parking next to the travelled way is permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incident management responds promptly to accidents and breakdowns to clear the road.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Vehicles using the road are predominantly cars, freight vehicles and long distance buses/mini-buses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-motorised vehicles are not permitted.</td>
</tr>
<tr>
<td>1A</td>
<td>Metropolitan Expressway</td>
<td>• Carries high speed traffic on a metropolitan-wide scale.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operating speed 100-120km/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Connects major regional activity nodes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum speeds apply (60km/h).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The only access to the facility is by means of grade-separated interchanges.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interchange spacing can be relaxed to a minimum of 1.5km.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No pedestrians or animals are permitted within the road reserve.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No stopping/parking next to the travelled way is permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incident management responds promptly to accidents and breakdowns to clear the road.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Vehicles using the road are predominantly cars, freight vehicles, long distance buses, express shuttles and minibuses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-motorised vehicles are not permitted.</td>
</tr>
<tr>
<td>2A</td>
<td>Major Arterial</td>
<td>• Carries longer distance intra-city traffic at reasonable speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operating speed 70 - 90km/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Access is via at-grade signalized intersections or grade-separated when the traffic volumes are very high.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No stopping/parking next to the travelled way is permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Access spacing of intersections 600-1500m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Access is strictly controlled, to very large developments only.</td>
</tr>
<tr>
<td>Class</td>
<td>Type</td>
<td>Function</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Carry the bulk of commuter, business, commercial and freight traffic in an area</td>
</tr>
</tbody>
</table>
| 2B    | Public Transport – Major Arterial | - First order public transport corridor, Bus Rapid Transit (BRT) mainline.  
- Priority given to mass mover line-haul public transport system, Bus Rapid Transit (BRT) vehicles.  
- Public Transport Priority Lanes  
- Provision of drop off facilities and park-and-ride for public transport.  
- High density mixed development corridor, development related to the transit system  
- Adequate provision made for pedestrians.  
- Access is via at-grade signalized intersections  
- Access spacing of intersections 500-1000m  
- Access is strictly controlled |
| 3A    | Minor Arterial | - Distributes traffic within a district comprising a number of suburbs/townships.  
- The last leg of longer distance journeys.  
- Operating speeds of 50-70km/h.  
- Lower level of mobility.  
- Access provided to limited number of large developments that warrant installation of a traffic signal.  
- No on-street parking/loading.  
- Generally signalized access. Medium sized roundabouts can be considered. |
| 3B    | Public Transport – Minor Arterial | - Second order public transport corridor, bus branch line or feeder services.  
- Priority given to public transport over other vehicles.  
- Public Transport Priority lanes  
- Shopping/activity street or medium density residential.  
- Not intended as a mobility route for private or commercial vehicles, accessibility only. |

(ii) Road Network Proposal

As shown in the Road Network Plan (Plan 7.5), the road network proposals are:

- **N1 (Urban Areas)**
  Mobility be improved and protected on the N1 by:
  - Limiting direct access to the road (access management);
- Converting some of the direct access intersections to interchanges (fly-overs);
- Relocating bus and tro-tro stops to be separated from the road;
- Removing on-street parking;
- Removing all traders from the reserve;
- Pedestrian crossings to be grade separated; and
- Preventing pedestrians from accessing the roadway.

• **N2: North of N1 (Urban Areas)**
  Mobility be improved and protected on the N2 by:
  - Converting this section to a Class 1A Road;
  - Limiting direct access to the road (access management);
  - Converting some of the direct access intersections to interchanges (fly-overs);
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing street parking;
  - Removing all traders from the reserve;
  - Grade separating pedestrian crossings; and
  - Preventing pedestrians accessing the roadway.

• **N2 South of N1 (Urban Areas)**
  Mobility be improved and protected on the N1 by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Converting to Class 2B road where BRT will be implemented;
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Removing all traders from the reserve;
  - Relocating bus and tro-tro stops to be separated from the road; and
  - Removing on-street parking.

• **N4: North of N1 (Urban Areas)**
  Mobility be improved and protected by:
  - Converting this section to a Class 1A Road as far as possible;
  - Converting the road to accommodate BRT in centre median with grade separated access for commuters;
  - Limiting direct access to the road (access management);
  - Converting some of the direct access intersections to interchanges (fly-overs);
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking;
  - Removing all traders from the reserve;
- Grade separating pedestrian crossings; and
- Preventing pedestrians accessing the roadway.

• **N4 South of N1 (Urban Areas)**
  Mobility be improved and protected by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Converting to Class 2 road and 2B when BRT is implemented;
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Removing all traders from the reserve;
  - Relocating bus and tro-tro stops to be separated from the road; and
  - Removing on-street parking.

• **N6: North of N1 (Urban Areas)**
  Mobility be improved and protected by:
  - Converting this section to a Class 1A Road as far as possible;
  - Converting the road to accommodate BRT in centre median with grade separated access for commuters;
  - Limiting direct access to the road (access management);
  - Converting some of the direct access intersections to interchanges (fly-overs);
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking;
  - Removing all traders from the reserve;
  - Grade separating pedestrian crossings; and
  - Preventing pedestrians accessing the roadway.

• **N6 South of N1 (Urban Areas)**
  Mobility be improved and protected by:
  - Limiting direct access to arterial roads and higher order roads (access management);
  - Converting to Class 2 road and 2B when BRT is implemented;
  - Removing access to properties except major developments;
  - Preventing any trading in the road reserve or intersections;
  - Removing all traders from the reserve;
  - Relocating bus and tro-tro stops to be separated from the road; and
  - Removing on-street parking.
• **R40: Urban Areas**
  Mobility be improved and protected by:
  - Converting this section to a Class 2 Road;
  - Limiting direct access to the road (access management);
  - Converting some of the direct access intersections to interchanges (fly-overs);
  - Relocating bus and tro-tro stops to be separated from the road;
  - Removing on-street parking;
  - Removing all traders from the reserve;
  - Grade separating pedestrian crossings; and
  - Preventing pedestrians accessing the roadway.

• **New East-West Metropolitan Express Way:**
  - To be provided as a Class 1 road;
  - To be planned and reserved as a 3-lane per direction road;
  - Diverting from the N1 approximately 20km east of the N2 interchange with the N1 (at Tema);
  - On the west, diverting from the N1 at Kasoa; and
  - Passing to the north of the inland water body.

In determining the alignment for this proposed expressway two alternatives were considered. The first alternative (refer to **Plan 7.7** on the following page) followed the original bypass road which skirts the city to the north and links up with the N1 at Kasoa in the west, and some 15km east of the N2/N1 intersection. However, this alternative was deemed to be too far from the existing N1 to serve as an inter-urban expressway, which is what is needed for the region. Moreover nodal development along such a route would not support the idea of a compact region.

**Plan 7.7: Metropolitan Expressway Alternative 1**

The second alternative (refer to **Plan 7.8** on the following page), which also proved to be the preferred alternative, is the proposed alignment of the Metropolitan Expressway nearer to the urban core. It effectively supports the N1 as an inter-city traffic mover and also creates effective nodal development opportunities where it intersects with the major arterial roads of the region. Alternative 1 does not afford these required opportunities and benefits which it is believed is of utmost importance for the Region.

**Plan 7.8: Metropolitan Expressway Alternative 2**

• **New East-Trans African Highway:**
  - To be provided as a Class 1 road;
  - To be planned and reserved as a 3-lane per direction road;
  - To eventually be the East-West Trans African Highway; and
- On the East, diverting from the N1 just west of the Volta River crossing.

- **Provision of Class 2 and 3 supporting network**
  - A supporting road network is proposed which should be provided on Class 2 and 3 standards. The purpose of this network is to provide access to the higher order roads which feed from various developments. In the rural areas these are the major roads linking the villages and secondary nodes.

(b) **The Rail Network**

(i) **Commuter Rail Service**

The proposal as contained in *The Transport Master Plan Project in Greater Accra Region, Final Report, dated August 2016*, is supported. Refer to the table and figure below. The proposal entails the following:

- Urban railway length to be extended from 55.1km to 127.7km in the future.
- Both existing lines need rehabilitation in the short term and both need to be upgraded to double lines in the medium to long term.
- In the short term a side track could be installed at 2 stations and 4 halts, resulting in the number of train operations being increased.
- A new line be provided between Achimota and Kasoa.
- In the long term a line can be provided from Accra, via the Airport, to Adenta.
- Upgrading and provision of 6 stations.

It should be noted that the proposed rail line to Adenta is parallel to one of the proposed BRT lines. It is recommended that the BRT be prioritised and once passenger demand warrants it, corridor demand can be supported by a rail line.

**Table 7.11: Implementation Plan for Railway**

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Short-Term</th>
<th>Middle-Term</th>
<th>Long-Term</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Railway</strong></td>
<td>Accra-Amasaman (Rehabilitation) Achimota-Asoprochona (Rehabilitation)</td>
<td>Accra-Amasaman (Expansion) Achimota-Tema (Expansion)</td>
<td>Achimota-Kasoa (Construction) Accra-Airport-Adenta (Construction_Subway)</td>
<td>4 lines</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>(24.9km) (23.7km)</td>
<td>(24.9km) (30.2km)</td>
<td>25.8km 21.9km</td>
<td>47.7km (103.7km)</td>
</tr>
<tr>
<td><strong>Station</strong></td>
<td>Circle, Achimota, Dzorwulu, Shangrila, Adegonor and Queensland station</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
(ii) Trans-ECOWAS Rail Line

The Rail Master Plan dated December 2013 allows for 2 alternative alignments for the Trans-ECOWAS Line as Phase 4 of the Rail Plan. Alternative 1 is a coastal alignment from Sekondi to Lomi passing through Accra and Tema. Alternative 2 makes use of the existing rail line from Huni Valley passing through Achiasito Katoku Achimota as shown below.

The coastal line is not supported due to the spatial barrier it creates along the coast and the environmental impact of infrastructure passing through coastal wetlands.

Alternative 2 is supported with the possibility to link it with the proposed line from Tema to Akosombo, which is also a river port. This alignment can closely follow the alignment of the proposed outer mobility road (Trans Africa Highway). From Akosombo it can follow the proposed alignment to HO and can then extend to link with the existing rail line to Lome. This is shown in the figure below.
Figure 7.24: Proposed Trans-ECOWAS Rail Line with Additions

Source: Rail Master Plan of Ghana, 2013, Ghana Railway Development Authority

Figure 7.25: Proposed Trans-Ecowas Rail Alignment through GAR
(c) **Road Based Public Transport**

The proposal to transform the exiting transportation system is support in order to increase the mode share for public transport. Commuters require a higher level of service in the urban areas. Hence, there is the need to restructure the public transportation system in order for commuters to reach their destination within an hour. Therefore, changing the current ineffective and dilapidated public transport environment should be a top priority. The objective is to enhance public transport-based mobility and accessibility to ensure sustainable development.

At present, trotros dominate other modes. It is proposed that Bus and BRT should take the place of trotros with BRT playing the dominant role. A “Hub and Spoke” system is proposed with BRT and arterial busses providing the services between the hub and the trotros operating from the hubs as feeders and distributors.

The current BRT proposal is accepted and can be implemented as it supports the nodal developments proposed in the Spatial Development Framework

Six routes are proposed:
- Kasoa – CBD;
- Amasaman – CBD;
- Adenta – CBD;
- Ashaiman – Ringroad
- Motorway
- Achimota – Labadi

These routes are shown in the figure below.
(d) **Non-Motorised Transport (NMT)**

With the proposed nodal development of the SDF it is important that the NMT component also be addressed. NMT not only includes walkability aspects and pedestrians, but also the commuter cyclist. The following elements are important:

- **Provision of dedicated space for NMT:**
  - Space next to the road should be dedicated for pedestrians and commuter cyclists.
  - Sufficient space must be provided for both pedestrians and cyclists to share the facility.
  - Where extremely high pedestrian activity occurs, cyclists can be separated from the pedestrians.
  - NMT space must be surfaced.

- **Establishment of an NMT network:**
  - A primary NMT network must be identified for implementation between primary nodes.
  - NMT network be identified leading to public transport facilities.

- **Improve connectivity to public transport:**
  - Dedicated infrastructure be provided for this purpose which is separated from the roadway.
  - Shelters be provided at public transport stops.
(e) **Maritime Infrastructure**

(i) **Tema Port**

In response to growing maritime trade demands in Ghana and the sub region, Ghana Ports and Harbours Authority (GPHA) is upgrading and expanding the Ports of Ghana. By 2019 Tema Port’s capacity should be four times greater than presently enabling it to handle some of the world’s biggest container ships.

This will result in increased land-side space pressure to handle the additional cargo, especially adequate space for holding heavy vehicles. Precinct plans should be developed for the Tema port area.

It is proposed that an Inland Port be provided some 8 to 10 km north of Tema port close to the N2. The existing rail line from the port heading in that direction should be revived to carry cargo to this inland port. This proposal is discussed in more detail in the section dealing with Freight.

(f) **Freight Transport**

It is proposed that an inland / dry port be provided slightly north of Tema Port close to the N2 and an existing rail line. This facility is located within one on the nodes identified by the SDF. The location of the dry port is indicated in the figure below.

It is proposed that a rail line from Tema Port be provided and linked with the proposed inland port. This can form part of the Trans ECOWAS rail network as indicated in the section dealing with rail. Cargo can be carried from the harbour to the inland port which lessens the space requirement in and around the harbour. A tank farm should also be established at this port with a pipeline from the harbour. The port can further be used to break bulk freight into smaller containers for transport in different directions and with smaller vehicles. This will prevent the need for long cargo carrying vehicles to enter the congested urban and city areas.
Port services would typically include:

- Container handling and storage;
- Container stripping and stuffing;
- Break-bulk cargo handling and storage;
- Freight forwarding and cargo consolidation services;
- Tank farm for storage and distribution of liquids like fuel;
- Bulk cargo handling and storage;
- Custom inspection and clearance;
- Light container repairs; and
- Banking / insurance / financial services.

Types of cargo handled would generally be:

- International and domestic containers;
• Break-bulk freight for unloading from or loading into containers;
• Fuel;
• Non-containerized break-bulk freight (e.g. steel, general merchandise on pallets, bagged cement); and
• Bulk freight (construction materials, coal, fertilizers, chemicals etc.).

It is further proposed that freight vehicles only make use of the N-routes and other Class 1 and 2 roads. When entering the city / urban areas smaller vehicles should be used to facilitate mobility.

(g) Aviation Infrastructure

Kotoka International Airport (KIA) is currently the only international airport in Ghana. It is not only a gateway to Accra and Ghana, but also this African region. In 2013 KIA ranked 3rd in West Africa based on the number of passenger visits to Accra.

Ghana Airports Company Limited (GACL) has identified and is currently implementing various projects to increase the capacity of the airport to be sufficient for an estimated demand for 2035. These upgrades are being done on both air and land sides.

Moreover, there is a proposal to develop a new international airport in the Prampram area some 50km from Accra city centre. Should this airport be developed the basic requirement will be to provide good connectivity to Accra CBD. This should at least include a class 1 freeway and a high speed rail line connecting the CBD. The figure that follows conceptually indicates a possible alignment of the proposed High Speed Rail Link which links with the proposed commuter rail link. It further indicated the proposed road linkages also to be provided.

However, preceding this, it is proposed that a study be undertaken to establish whether KIA cannot be upgraded further in order to negate the need to move the airport. The study should include the impact of expropriating land to accommodate an additional runway and terminal facilities.
Figure 7.29: Aviation and Road Linkage Proposals
7.3.5 Engineering Services

(a) Water

(i) Recommendations

Addressing the deficiencies in part over the short term can be done through the following measures:

- Water Conservation and Demand Management (WCDM); and
- Upgrading / refurbishment of the existing water treatment plants to reinstate the original design capacities.

The only long-term solution, however, is to identify and develop additional resources. This can be achieved through the following:

- Identification and development of groundwater resources;
- Optimisation of existing surface water resources;
- Identification and development of additional surface water resources; and
- Desalination of sea water.

All of the abovementioned options require additional further investigation as well as technical and financial feasibility studies. These options also include inherent risks and complications. Table 7.12 below highlights the complicated nature of augmenting the bulk water supply to GAMA as well as the extent of the studies / investigations required to address the matter in a sustainable manner. It furthermore highlights the fact that no solution is without risks or complications.
Table 7.12: Options to augment potable water supply with risks

<table>
<thead>
<tr>
<th>Description</th>
<th>Identification and development of groundwater resources</th>
<th>Optimisation of existing surface water resources</th>
<th>Identification and development of additional surface water resources</th>
<th>Desalination of sea water</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actions / Investigations</strong></td>
<td>• Geological and geophysical studies; • Exploration; • Environmental impact studies; • Development and equipment of well fields; • Infrastructure development; and • Integration into existing infrastructure.</td>
<td>• Improved Decision Support Systems; • Development of improved multi-lateral basin agreements for the Volta basin; • Harvesting of water releases downstream of the hydropower generation sites for human and industrial use; • Environmental impact studies; • Design and development of new water treatment plants, reservoirs, pump stations and bulk transmission infrastructure; and • Integration into existing infrastructure.</td>
<td>• Surface water studies (identification and feasibility studies); • Development by / multi – lateral basin agreements (if required); • Environmental impact studies; • Design and development of new dams, water treatment plants, reservoirs, pump stations and bulk transmission infrastructure; and • Integration into existing infrastructure.</td>
<td>• Technical and financial feasibility studies into site selection, appropriate abstraction and discharge alternatives and viability of options; • Technology selection; • Environmental impact studies; • Infrastructure development; and • Integration into existing infrastructure.</td>
</tr>
<tr>
<td><strong>Risks / Complications</strong></td>
<td>• Availability of adequate / suitable resource(s); • Potential pollution of resources as a result of human development; • Environmental impacts; and • Potential pollution of resources due to ingress of salt water in the event of the resource in proximity of the coast.</td>
<td>• Resource being stressed due to developments (industrial, irrigation and energy requirements); • Yield of resource being impacted upon by climate change; • Conflicting priorities of multi-national stakeholders; • Complex multi-national agreements; • Environmental impacts; • Potential impact of water harvesting related infrastructure on the power generation ability of existing facilities; and • Developmental cost if infrastructure.</td>
<td>• Availability of adequate / suitable resource(s); • Yield of resource being impacted upon by climate change; • Environmental impacts; • Potentially complex multi-national agreements; • Potential conflicting priorities of multi-national stakeholders; and • Developmental cost if infrastructure.</td>
<td>• Suitable sites for the development of desalination plants; • Long term environmental impact on marine life; and • Community resistance; • Development costs; • Lack of suitable expertise to operate infrastructure; and • Operational costs;</td>
</tr>
</tbody>
</table>
(b) Sanitation

(i) Future Treatment Capacity

It is anticipated that all future developments will be serviced with water borne level of sanitation. The sewage that is generated will be treated at designated wastewater treatment facilities.

Accra’s topography ranges from coastal plains in the south east, with some areas lying below sea level, to hilly formations in the west. As a result, decentralised treatment facilities will be a suitable solution to accommodate the generated sewage. The size and location of these will be determined by the size and characteristics of the development catchments and topographies.

There are various treatment technologies to be considered such as membrane reactors, sequence batch reactors, activated sludge and wetlands. The technologies will be determined by the location of the treatment facilities and required treated effluent standards to be met. In the coastal low-lying areas, marine outfall sewers may be a feasible solution to cater for required treatment capacity.

The sewage that is generated will be treated to international standards that prescribe the level of treatment required before discharging to water resource bodies, the intention being to minimize the negative environmental impact of the treated effluent on the receiving water bodies. This treated effluent can also be treated to specific standards enabling it to be reused for agricultural, industrial or irrigation purposes. This will benefit Accra in that the demand for potable water supply could decrease.

The solid waste that is generated from the treatment facility can be further treated to generate methane gas which can be converted to electrical energy. This can be used to operate the treatment facility and consequently decrease the energy demand by the facility. In addition, the same waste can be further treated to produce compost that can be used in the agricultural sector.

(ii) Proposals for the Way Forward

The following strategic elements need to be considered to ensure that the sewerage networks in the GAR are functioning optimally and that appropriate building blocks are in place to support the Strategic Investment Plan:

- Reduce open defecation across the entire region by introducing more public toilet facilities.
- Uphold existing sewerage infrastructure effectively and ensure that there are funds year on year for the basic maintenance of treatment plants.
- Reduce blockages in pipelines as and when they occur.
- Upgrade existing facilities to cater for existing and future demand.
• Ensure lower service rates for low-income households.

• Compile a Sewer Master Plan for GAR.

(c) **Stormwater**

The following strategic elements need to be considered to ensure that the stormwater network in the GAR is functioning optimally and that building block are in place to support the Strategic Infrastructure Plan (SIP):

• Effective maintenance of the exiting stormwater systems;

• Educating residents on the effects and causes of dumping solid waste into the stormwater systems.

• Encouraging communities to participate in cleaning their areas in and around stormwater channels.

• Introducing a maintenance program to clean and desilt the major channels prior to the rainy season.

• Increasing permeable areas and natural vegetation and reducing occupancy of low-lying areas and floodplains.

• Developing a Stormwater Master Plan for the entire region.

(d) **Waste Disposal**

To improve living conditions and reduce the risk of contamination and spread of disease through lack of solid waste collection, the following should be considered:

• Strategic planning regarding waste disposal site locations.

• Proper maintenance and operation of all waste disposal sites.

• Incorporation of informal Waste Picketers as part of the recycling process, instead of marginalising these groups.

• Expanding the recycling initiative for reusable items. This will significantly reduce the amount of waste reaching the landfill sites thereby extending the lifespan of all sites.

• Ensuring waste collection is done routinely; preventing bins from overflowing and waste clogging rivers, streams and drainage channels.

• Encouraging communities to participate in cleaning up efforts in and around their own residential areas.
7.3.6 Electricity

(a) RSDF Network and Service Areas

Referring to the figure below, all development that falls to the east of Tema including village nodes (7 to 11), secondary node (5) and the new airport node (6) would be a challenge to service using the current existing transmission and distribution network layout. This is due to the current transmission line footprint which does not make provision for significant service demand on the eastern parts of the GAR, beyond Tema. Although these areas are closer to the generation stations the transmission infrastructure layout favours deployment of services from Tema to the west towards Accra and beyond.

There is however a future planned 330kV transmission line which may provide most these developments on the condition that they are south of the N1 route. Correspondingly, ECG bulk supply points and a distribution network would have to be established as well.

This means that all other development north of the N1 including the new airport (node 6) would trigger the need for new transmission infrastructure, north of the N1 and running across from Tema through Prampram, Ada West and Ada East. This additional transmission line would cater for the areas further north i.e. nodes 5, 6, 7 and 11 while increasing redundancy for the already planned 330kV lines.

A significant remainder of the proposed development as per this RSDF falls within and around Accra CBD and Tema (including nodes 1 to 4, of the five proposed secondary nodes). This means that from a services layout perspective, most of the areas earmarked for development and densification would be easier to reach from the transmission line corridor. An additional 3 to 4 ECG BSP’s and distribution infrastructure would also be required to support development and densification within / around nodes 3, 4, 12, 13 and 15.

It is however highlighted that the transmission system has inadequate firm transfer capability to some of the major load centres (of Accra, Kumasi, Tarkwa, etc.) mostly at peak. Hence even if the power stations could generate the required capacity to meet demand, the grid system simply does not have the capability to transmit the full required supply. It is also concluded that the existing only 330kV transmission line from Tema, past Madina and Ashiaman would be insufficient to carry demand. Some intervention and investment is required in order to support development as per the RSDF. There is also a need to augment...
the future transmission and distribution infrastructure plans to align them with the new regional spatial framework.

![Figure 7.31: RSDF Electricity Network and Service Areas](image)

(b) **RSDF Demand Sector Profile**

Referring to the status quo analysis contained in Volume 1, the highest prominent national spot load increase is envisaged within GAR by Enclave Power Authority, Tema Free Zone at an expected demand of 42MW. This represents a spot load increase in industrial type development within and around node 16.

The numerous rural electrification projects earmarked for commissioning in 2016 are expected to lead to further demand increases on the ECG distribution networks. The network expansion works and initiatives aimed at improving the quality of distribution services by ECG are also expected to allow the connection of new loads. This is expected to result in an increase in demand in the residential, commercial and industrial sectors (see nodes 14 and 15 and other similar nodes).

This confirms the assertion that development is highly concentrated around Tema and Accra load centres. It also confirms the significant influence that GAR development has on the country as a whole.

It can thus be concluded that the proposed RSDF is already aligned with the expected demand sector trends which show a large percentage share from the industrial and residential demand sectors. The two sectors have a combined average of ±86.65% of total power consumption across all sectors.
(c) **RSDF Demand Projections and Demand Growth Rates**

Demand projections for the RSDF are detailed in the different tables below. From the spatial planning proposals it is concluded that the RSDF’s estimates for total energy demand will be ±24 011.73 MVA by 2037. Assuming that the region places a minimum 10% off grid supply across all new developments starting from 2020, this amount then decreases to 21 731.56 MVA (or ~20 232.16 MW contingent on strict power factor correction). This estimate is only applicable in the instance that development results in energy demand increase at an annual growth rate of:

- 8.024% for West GAR and 7.503% for East GAR from 2016 to 2020; and
- 16.94% (region average) from 2020 until 2037.

When comparing the current ECG demand projections for GAR with RSDF projections, the shift in projects as per the following tables are observed. Based on current ECG projections, West GAR demand is expected to grow at an annual compounded rate of 8.024% (2016-2020) and then a lower rate of 7.124% (2021-2025). Similarly the East GAR projections indicate 7.503% growth rate (2016-2020) and then a lower 7.076% annual compounded rate during 2021-2025.

In the RSDF projections, all ECG projections are preserved for the period 2016-2019. From 2020 to 2037, annual compounded rates have been revised to achieve the required 21 731.56 MVA (i.e. ~20 232.16 MW) by 2037.

**Table 7.13: RSDF Demand Projections – 2037 Envisaged Land Uses**

<table>
<thead>
<tr>
<th>Land Uses</th>
<th>Area (ha)</th>
<th>Coverage</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>2 332 169 units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial and Commercial</td>
<td>6050</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>5970</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>5600</td>
<td>40%</td>
<td>2 storeys</td>
</tr>
<tr>
<td>Health</td>
<td>2480</td>
<td>50%</td>
<td>2 storeys</td>
</tr>
</tbody>
</table>

**Table 7.14: RSDF Demand Projections - Residential Sector Split**

<table>
<thead>
<tr>
<th>Residential Sector</th>
<th>% Split</th>
<th>No. of Units</th>
<th>Demand (MVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>33%</td>
<td>769615.77</td>
<td>1924.039425</td>
</tr>
<tr>
<td>Middle</td>
<td>47%</td>
<td>1096119.43</td>
<td>3288.35829</td>
</tr>
<tr>
<td>High</td>
<td>20%</td>
<td>466433.8</td>
<td>1865.7352</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>7078.132915</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Table 7.15: RSDF Demand Projections - Non-Residential Sector Split

<table>
<thead>
<tr>
<th>Non-Residential</th>
<th>Area (ha)</th>
<th>Area (coverage only) (ha)</th>
<th>Demand (MVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>3025</td>
<td>2420</td>
<td>7260.00</td>
</tr>
<tr>
<td>Commercial</td>
<td>3025</td>
<td>2420</td>
<td>1936.00</td>
</tr>
<tr>
<td>Retail</td>
<td>5970</td>
<td>3582</td>
<td>2865.60</td>
</tr>
<tr>
<td>Education</td>
<td>5600</td>
<td>4480</td>
<td>3136.00</td>
</tr>
<tr>
<td>Health</td>
<td>2480</td>
<td>2480</td>
<td>1736.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>16933.60</strong></td>
</tr>
</tbody>
</table>

### Table 7.16: RSDF Demand Projections - GAR Totals

<table>
<thead>
<tr>
<th>GAR Totals:</th>
<th>% Weight</th>
<th>Demand (MVA)</th>
<th>10% Renewables (MVA)</th>
<th>Grid Connected (MVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>29%</td>
<td>7078.13</td>
<td>672.15</td>
<td>6405.99</td>
</tr>
<tr>
<td>Industrial</td>
<td>30%</td>
<td>7260.00</td>
<td>689.42</td>
<td>6570.58</td>
</tr>
<tr>
<td>Commercial</td>
<td>8%</td>
<td>1936.00</td>
<td>183.84</td>
<td>1752.16</td>
</tr>
<tr>
<td>Retail</td>
<td>12%</td>
<td>2865.60</td>
<td>272.12</td>
<td>2593.48</td>
</tr>
<tr>
<td>Education</td>
<td>13%</td>
<td>3136.00</td>
<td>297.80</td>
<td>2838.20</td>
</tr>
<tr>
<td>Health</td>
<td>7%</td>
<td>1736.00</td>
<td>164.85</td>
<td>1571.15</td>
</tr>
<tr>
<td><strong>100%</strong></td>
<td></td>
<td><strong>24011.73</strong></td>
<td><strong>2280.18</strong></td>
<td><strong>21731.56</strong></td>
</tr>
</tbody>
</table>

### Table 7.17: RSDF Demand Projections - Year-on-Year GAR Projections for Energy Demand (ECG vs RSDF)

<table>
<thead>
<tr>
<th>Year</th>
<th>ECG Projections</th>
<th>RSDF Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW</td>
<td>% Increase</td>
</tr>
<tr>
<td>2016</td>
<td>968.2</td>
<td>0%</td>
</tr>
<tr>
<td>2017</td>
<td>1031.2</td>
<td>6.50%</td>
</tr>
<tr>
<td>2018</td>
<td>1112.2</td>
<td>7.86%</td>
</tr>
<tr>
<td>2019</td>
<td>1210.0</td>
<td>8.79%</td>
</tr>
<tr>
<td>2020</td>
<td>1311.2</td>
<td>8.36%</td>
</tr>
<tr>
<td>2021</td>
<td>1335.7</td>
<td>1.87%</td>
</tr>
<tr>
<td>2022</td>
<td>1422.6</td>
<td>6.51%</td>
</tr>
<tr>
<td>2023</td>
<td>1522.8</td>
<td>7.04%</td>
</tr>
<tr>
<td>2024</td>
<td>1637.4</td>
<td>7.53%</td>
</tr>
<tr>
<td>2025</td>
<td>1758.1</td>
<td>7.37%</td>
</tr>
<tr>
<td>2026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2027</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 7.18: RSDF Demand Projections - Demand Growth Rates (ECG vs RSDF)

<table>
<thead>
<tr>
<th>Year</th>
<th>ECG Projections</th>
<th>RSDF Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW</td>
<td>% Increase</td>
</tr>
<tr>
<td>2028</td>
<td>4948.18</td>
<td>16.94%</td>
</tr>
<tr>
<td>2029</td>
<td>5786.40</td>
<td>16.94%</td>
</tr>
<tr>
<td>2030</td>
<td>6766.62</td>
<td>16.94%</td>
</tr>
<tr>
<td>2031</td>
<td>7912.88</td>
<td>16.94%</td>
</tr>
<tr>
<td>2032</td>
<td>9253.32</td>
<td>16.94%</td>
</tr>
<tr>
<td>2033</td>
<td>10820.83</td>
<td>16.94%</td>
</tr>
<tr>
<td>2034</td>
<td>12653.88</td>
<td>16.94%</td>
</tr>
<tr>
<td>2035</td>
<td>14797.45</td>
<td>16.94%</td>
</tr>
<tr>
<td>2036</td>
<td>17304.14</td>
<td>16.94%</td>
</tr>
<tr>
<td>2037</td>
<td>20235.46</td>
<td>16.94%</td>
</tr>
</tbody>
</table>

### RSDF Energy Remarks

It is evident that continued investment in energy generation, transmission and distribution projects forms a critical element of development planning considerations.

Improved network typology and architecture must form part of new development going forward to avoid network loads that are islanded in the event of outage on some radial lines.

Renewables are a critical element to the energy mix of future regional developments. This will provide the balanced power and energy portfolio that mitigates low reservoir elevations and low thermodynamic fuel supplies. Future development must have renewable energy as part and parcel of its core development structure.

Unmanaged densification poses uncontrolled and unpredictable demand on the system. Excessive densification within a limited space poses problems with capacity, space for services and concentration of unsightly installations that take away from the natural visual character of the urban space.
7.4 Spatial Development Guidelines

This section provides regional development guidelines for the many remedial mechanisms or strategic interventions that are proposed for the urban development region of GAR.

7.4.1 Growth Management

Growth management refers to specific interventions aimed at influencing how growth occurs, within a city or region. The focus is to accommodate growth realistically and not to prevent or limit it, but to control it. Therefore, growth management goals are set to counteract sprawl and affect density, availability of land, land use mix, etc. and generally include goals to:

- Limit outward expansion;
- Encourage higher density development;
- Encourage mixed-use development;
- Reduce travel by private vehicles;
- Revitalise older areas; and
- Preserve open space.

Growth management requires a comprehensive package of mechanisms, incentives and disincentives across multiple departments and disciplines. The implementation of tools and mechanisms for growth management must follow a three-pronged approach, namely:

- Preventing development in sensitive environments;
- Discouraging development in peripheral locations (i.e. curbing urban sprawl); and
- Encouraging development primarily in central or strategic locations (i.e. ensuring internal spatial restructuring).

There are several growth management tools available to guide and influence public and private development processes, and the demarcation of an urban development boundary is one such growth management tool, but its efficiency is significantly enhanced only when used in combination with some of the other instruments.

This section elaborates further on some of the most prominent growth management tools that can be used to guide, direct and influence development patterns and trends in the GAR.

Table 7.19: Application of the growth management tools in the GAR

<table>
<thead>
<tr>
<th>Growth Management Tool</th>
<th>Application in GAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive plan</td>
<td>The comprehensive plan is a document composed of written goals and policies as well as maps used to guide the type, location, and quantity of development in a community over a 10 or 20-year period based on existing conditions and future hopes. This plan is strategic in nature and should include goals for economic growth and how it can be contained within existing areas or areas</td>
</tr>
<tr>
<td>Growth Management Tool</td>
<td>Application in GAR</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>designated for growth. Such plans can be compiled at a regional as well as at local level. In the GAR context, this refers to the GARSDF.</td>
<td></td>
</tr>
<tr>
<td>Urban development boundary (UDB)</td>
<td>The demarcation of an UDB is to identify the accepted area within which urban development will occur over time. It does not suggest that urban development within the boundary will be permitted on an ad hoc basis and in an uncontrolled manner. Urban development will be permitted only within the context of the availability of engineering services, the ability to maintain such engineering services, the protection of the environment and the provision of sufficient transport networks. All metropolitan rules, regulations and policies to achieve sustainable urban growth will apply within the urban boundary. The purpose of the UDB is to create a permanent boundary for the city beyond which no further development will be allowed, to achieve a sustainable compact city in the interest of all its citizens.</td>
</tr>
<tr>
<td>Threshold public service standards</td>
<td>This relates to the level of public services that must be provided for different types of development. Service levels can be set for schools, water, sewers, roads, transport, libraries and parks. Proposed development that will result in non-maintenance of these service levels can be denied approval. In the case of GAR, these standards are set in the Zoning Guidelines and Planning Standards, 2011 of the Ministry of Environment Science and Technology Town and Country Planning Department.</td>
</tr>
<tr>
<td>Land-use and infrastructure coordination</td>
<td>This strategy requires development to occur in areas already served by existing bulk service networks or areas planned to be served by such networks in order to prevent leapfrog development and continuous demands for service extensions. For the GAR, this coordination is generally encouraged through the Medium Term Development Frameworks.</td>
</tr>
<tr>
<td>Redevelopment areas (brownfields)</td>
<td>These are programmes at a regional level in the GAR to promote economic development and/or redevelopment in needy and rundown areas by means of infrastructure improvements, urban revitalisation, etc. In the GAR context these could include the CBD of Accra, and the denser settlements.</td>
</tr>
<tr>
<td>Growth Management Tool</td>
<td>Application in GAR</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Strategic development areas</strong></td>
<td>These are strategically located vacant areas designated for growth. The area is chosen due to its strategic location, the services available in the area, and/or because of local zoning regulations or comprehensive plans. These areas are used as priority funding areas and can represent both infill development and urban expansion. The GARSDF identified future nodes and corridors as such strategic development areas.</td>
</tr>
<tr>
<td><strong>Focused economic development in growth areas</strong></td>
<td>The objective is to direct economic growth towards areas specifically designated for growth (i.e. primary and secondary nodes) and then to properly provide the infrastructure required to maintain these areas. This approach also supports the implementation of proper public transportation as these nodes represent clear destinations around which to design a public transport system. For the GAR, a system of primary, secondary and tertiary nodes is proposed. These nodes are arranged, based on planning theory, around the proposed core node and is aimed at providing infrastructure so as to provide for economic growth and residential densification in these nodes.</td>
</tr>
<tr>
<td><strong>Zoning</strong></td>
<td>Zoning ordinances specify written requirements and standards for permitted uses of buildings, the height and size of buildings, the size of yards, parking, signs and fences, among others. The purpose is to separate land uses that are seen as incompatible. The separation of uses aids growth management by separating uses such as agricultural and rural from residential and industrial.</td>
</tr>
<tr>
<td><strong>Bulk service contributions</strong></td>
<td>Bulk service contributions are a cost assessment imposed against new development to generate revenue to fund or recover the costs of reasonable service improvements necessitated by the development. This tool must be imposed carefully to balance the competing demands presented when dealing with the pros and cons of new development. Obligations imposed during development applications, generally require developers to fund, build, and dedicate for public use, basic facilities required by future residents of the new developments.</td>
</tr>
<tr>
<td><strong>Incentives</strong></td>
<td>The creation of incentives and concession packages is one of the most important methods used to attract new investment, which can be efficiently and innovatively applied to initiate development in focus areas. Incentive and concession packages that are offered are: rates and taxes incentives; Infrastructure concessions; Land and buildings incentives; Regulatory reform concessions; and Finance incentives.</td>
</tr>
</tbody>
</table>

---

### Growth Management Tool

| Transit-oriented development (TOD) | TOD forms an important component of the GARSDF as it provides the basis for the development of the system of nodes. The SDF identifies a number of rail stations and road-based public transport routes that form the basis for residential densification. |

### 7.4.2 Densification

The formal definition for densification is “the increased use of space both horizontally and vertically within existing areas, properties or new developments accompanied by an increased number of units and / or population thresholds”. Densification is a mechanism to manage rapid urbanisation and to create an efficient, safe and sustainable urban environment that offers high-quality public spaces and access to good public transport, services and recreation opportunities.

As a tool for managing rapid urbanisation, densification has several advantages as illustrated below.

- Provides more housing choices and creates a safer and more user-friendly city.
- Economic investment, opportunity and convenience.
- Makes better use of limited resources and cuts infrastructure costs.
- Increasing the threshold of public infrastructure / transportation investments and maximising the usage of such investments.
- Protects the environment.
- Supports the provision of public transport.
- Minimising / reducing commuter distances.
- Minimising / reducing vehicle emissions.
- Supports the provision of social and business services.
- Provides better access to schools, work, recreation and services.

**Figure 7.32: Benefits of Densification**

Densification can be achieved by:

- Increasing the number of units by building extra floors;
- Increasing the size of the building;
- Consolidating land for development or undertaking redevelopment;
• Subdividing land; and
• Building on vacant or underused land.

The figure below illustrates the comparative application of density relative to surface area and shows how the same density can create different living environments.

![Figure 7.33: Density Comparison](Source: City of Cape Town Densification Policy 2011)

In the process of implementing densification (at appropriate levels over time) and capitalising on the advantages thereof, densification should relate to:

• High-density developments in strategic or key locations, such as near existing (rail) and future (BRT and rail) public transport routes and the CBDs;
• Mixed land-uses by combining living and work places to reduce travel;
• Public transportation routes and areas of extensive public investment in road and transportation infrastructure;
• Social facilities; and
• Business nodes, such as airport city.

The following general guidelines (expressed as gross densities) are proposed for residential development within the urban areas of the GAR:

• Transit Oriented Development (TOD): 120 dwelling units per hectare (du/ha) within a 500m radius of the public transport facility that comprises the core of a transit oriented development (for example commuter railway stations, BRT-trunk station, etc.);
• Secondary nodes: 120 du/ha within 500m radius from core of node;
• Primary nodes (CBDs): 500 du/ha within the node or within 500m radius from core of node;
• Along development corridors: 100 du/ha within 500m of service / road.
• Along high-order mobility routes (outside the threshold distances specified for TODs, primary, secondary and tertiary nodes): residential densification can be considered on merit, with due regard for aspects such as accessibility, access management, potential impact on transport mobility and potential impact on and interface with other surrounding developments.
7.4.3 Transit-Oriented Development

In its simplest form Transit-Oriented Development (TOD) is a development next to a transit station or the area surrounding a railway or bus station. At its core TOD includes a mixture of land uses integrated into a walkable neighbourhood and located within approximately 800-1000m from a public transport facility.

Figure 7.34: TOD Nodes Linked by Mass Transport

The trend towards TOD is motivated by rapidly growing traffic congestion and the desire for quality urban life. Thus, its aim is to:

- Support efficient transit;
- Reduce dependence on private cars;
- Optimise the use of land around public transport facilities;
- Reduce travel times; and
- Protect the environment.

The benefits of TOD are:

- Higher quality of life with better places to live, work and play.
- Greater mobility with ease of moving around.
- Increased transit ridership.
- Reduced traffic congestion, car accidents and injuries.
- Reduced household spending on transportation, resulting in more affordable housing.
- Healthier lifestyle with more walking and less stress.
- Higher and more stable property values.
- Increased foot traffic and customers for area businesses.
- Greatly reduced dependence on foreign oil, reduced pollution and environmental damage.
- Reduced incentive to sprawl and increased incentive for compact development.
• Less expensive than road construction, infrastructures and sprawl.
• Enhanced ability to maintain economic competitiveness.

*Source: The Transit Oriented Development Institute*

TOD is to be promoted around railway stations in existing and proposed future residential areas and around the proposed BRT stations. The following TOD principles and guidelines can be used to guide development that recognises the important relationship between land use and transportation planning.

Table 7.20: TOD Guidelines

<table>
<thead>
<tr>
<th>Principle</th>
<th>Guidelines</th>
</tr>
</thead>
</table>
| **1. Ensure a mix of appropriate land use.** | • Mix of residential, employment, supporting retail and service land uses.  
• Mixed land-uses can be horizontally or vertically integrated.  
• Use higher densities to increase the diversity of housing types.  
• Encourage travel in both directions at all times along a transit line, reducing one-way congestion.  
• Discourage auto-oriented uses on higher order transit corridors and transit stations. |
| • An appropriate range of uses should be allowed at transit stops/areas.  
• Mix uses will promote 24 hour activity.  
• 24-hr activity improves safety, security and surveillance. |  

Mixing land use can occur horizontally across a site, or vertically within a building.

*Source: Transit Oriented Development Policy Guidelines, The City of Calgary*

| **2. Increase density around transit stations.** | • Relate densification to the surrounding context and particular station type.  
• Densify at locations with the best access to transit and public transport systems.  
• Locate highest density uses and building forms (e.g. apartments, office towers) as close as possible to the station building.  
• Create transition between higher and lower intensity |
| • Compact urban form improves walkability.  
• Density and compact form |
<table>
<thead>
<tr>
<th>Principle</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>improves efficiency of services, infrastructure, land use, etc.</td>
<td>development by stepping down building heights and densities from the station building outward.</td>
</tr>
</tbody>
</table>

Density should transition from high to lower density, ensuring compatibility with adjacent communities.  
*Source: Transit Oriented Development Policy Guidelines, The City of Calgary*

### Create pedestrian-oriented design.

- Create convenient, comfortable, direct and safe pedestrian linkages.
- Accessibility and mobility.
- Improved connectivity.

- Each station area should be developed as a unique environment.
- Ensure sidewalks are accessible for easy movement.
- Plan for pedestrians from initiation phase.
- Primary and secondary pedestrian routes should be identified in the TOD station area.
- TOD buildings should be designed to ensure that pedestrian comfort is of primary importance in station areas.

Primary and secondary pedestrian connections provide access to the transit station and throughout the area  
*Source: Transit Oriented Development Policy Guidelines, The City of Calgary*

### Promote Place Making

- Should be of a human scale
- Focus on promoting liveability, quality and uniqueness of space.

- Transit stations or stops should form part of a focal point.
- Create a focus, utilise unique buildings or public spaces as focal point and source of identity.
- TOD areas should encourage public spaces and public interaction.
- Buildings and public spaces should be oriented to the street.
- Use open spaces.
<table>
<thead>
<tr>
<th>Principle</th>
<th>Guidelines</th>
</tr>
</thead>
</table>
| **5** Promote connections | • Transit routes should be viewed as a network  
• TOD areas should serve as transfer points (where applicable).  
• TOD should make connection to other modes of transport and improve connectivity in the region.  
• Higher order TOD areas should provide for integration and transfer between modes.  


(a) Airport Development – Current and Future

Airports have become vibrant catalysts for urban development worldwide. In the case of GAR this is proving to be true in view of the airport city area developments and expansions in recent years. Airports offer the opportunity to develop 360° around them, providing full coverage.

As regards land uses to serve airports and to maximise such potential, the following should be provided for within a 30 minutes travel distance:

- Hotels
- Conference facilities
- Recreation and entertainment
- Exhibition centres
- Tourism administration
- Retail/ business
- Light industrial
- Commercial/ warehousing
- High tech industries
- Research and technology (could be linked to university)
- Offices
- High density residential
- Medical transfer

It is further suggested that land be reserved for an additional runway to the east of the existing facility so as to maintain the airport in its present location for as long as is possible.

Figure 7.35: 360°-Encircling Airport Development
All public transport options to serve the airport and its surrounds should be implemented as a matter of urgency.

(b) Proposed International Airport

The proposed new airport located north-north-east of Prampram is deemed a potential strategic development project. Although the project will not be implemented in the immediate future, the potential exists for it to happen. If it happens it will affect the urban boundary and have a dramatic impact on the rural nature of the airport and its surrounds. Therefore, as and when it is developed consideration has to be given to the urban development boundary, as to whether the current Greater Accra Region UDB will be extended to include the airport or whether it will be enclose by its own boundary. Even so sufficient growth space must be provided for the development to yield an intensive urban character, composition and typology, similar but more intense than KIA airport city. The development will have to be supported by integrated land use and transportation plans which should ensure that the airport and surrounds is connected via rail (for passengers) to Accra and Tema. Such integration will ensure that the airport city will not become a remote island but will be functionally linked to the primary zones of the Region and so boost the economy and have the desired multiplier effects.

The integration of the proposed airport with the metropolitan area will need to be achieved via good rail and road transport links. Good linkage to the rural area will have to be via upgraded roads.

(c) Trans African Highway (TAH)

The Trans African Highway should not traverse the urban area and should not intersect with any settlements in the rural areas owing to the express nature and function of this high-order transit corridor. The TAH is regarded as an inter-continental mover of people and goods which should have an unprohibited mobility function. Good access to the system should be provided only at strategic access points and such access should be by way of systems interchanges, to maximise the advantage this facility offers for the economy of the GAR.
7.5 Institutional Issues

Although a good institutional framework exists for the GAR the following possibilities can be considered to streamline and facilitate the longer term growth and development of the region:

(a) Metropolitan Agency

The provision of service delivery and development has not kept up with the development of the urban areas as rapid urbanisation has taken place. This means that development issues have occurred across the borders of different districts.

The current management system is fragmented as it constitutes several district assemblies which make it difficult to activate integrated service development. Therefore, it is suggested that research be done into the establishment of a single metropolitan planning agency to manage these issues across borders. A metropolis can be described as a large city or conurbation which is a significant economic, political and cultural centre for a country or region, and an important hub for regional or international connections, commerce, and communications.

In the case of Accra this could mean a single metropolitan agency which includes all the assemblies within the urban boundary (including Accra and Tema metropolitan assemblies) as the coordinating agency and the existing assemblies being administrative and implementing bodies.

The establishment of such a planning agency can be done in support of Action 5 of the National Urban Policy Framework and Action Plan, May 2012.

(b) Market towns

The development of market towns as proposed for the rural component of the GAR could also bring about an adjustment to the present administration and management within the GAR. The extent of the market towns will ultimately be such that they will warrant the institution of town councils, supported by the necessary administrative and implementation support structures to develop and maintain such towns.

(c) Growth Management Strategy

In the context of the GAR, it is suggested that a Growth Management Strategy (GMS) be developed to achieve the following:

- Prevent development in sensitive environments;
- Discourage development in peripheral areas / curbing urban sprawl; and
- Encourage development primarily in central or strategic locations.
In essence, the GMS is an implementation strategy for the RSDF of the GAR. The GMS entails the application of a number of Growth Management Tools in combination with one another with the view to achieve the desired spatial outcome as reflected in the RSDF. These tools may include, but are not limited to the following:

- Structure plans;
- Land use and infrastructure coordination;
- Redevelopment areas – the development of infill areas rather than peripheral areas;
- Strategic development areas – this would include areas such as the airport, the port and the beach front of Accra;
- Zoning schemes to focus on inward development; and
- Transit oriented development to achieve compact urban form (rural and urban) and to maximise public transport opportunities.

The following thematic areas of concern have been addressed through the proposals of this RSDF.

#### Table 7.21: National Urban Policy – Action Areas

<table>
<thead>
<tr>
<th>Action Areas</th>
<th>Policy Initiative</th>
</tr>
</thead>
</table>
| **Action Area 1:** Balanced redistribution of urban population | 1.1 Create and develop new growth points as counter magnets for fast growing cities such as Accra and Kumasi (identify potential growth points within the urban hierarchy).  
1.2 Promote accelerated growth of small and medium sized towns. |
| **Action Area 2:** Spatially integrated hierarchy of urban centres | 2.1 Undertake a study and establish a hierarchy of urban centres for defined functions and levels of services.  
2.2 Spatially integrate regional and district capitals by transportation and communications facilities and other relevant services.  
2.3 Minimize the travel time between service centres of all sizes and their hinterlands.  
2.4 Establish rural service centres and strengthen rural-urban linkages to promote agriculture and the development of agro-based industries. |
| **Action Area 3:** Urban economic development | 3.1 Promote local economic development (LED).  
3.2 Improve urban services and infrastructure to support and advance industrial investments and production.  
3.3 Target growth centres as choice destinations for infrastructural development and economic activities.  
3.4 Enhance the competitiveness of Ghanaian cities in regional and international context.  
3.6 Ensure that urban planning provides for the activities of the informal economy. |
| **Action Area 4:** Environmental Quality | 4.1 Develop and manage infrastructure systems with appropriate technology to provide basic hygienic conditions in towns and cities.  
4.2 Prepare and implement sanitation action plans for all leading urban centres, including related statutory regulations and by-laws ensuring effective collection, disposal and treatment of solid, liquid and toxic waste.  
4.5 Protect open spaces, greenbelts, forest reserves, water bodies, wetlands, water catchment areas and other ecologically sensitive areas from physical development and urban encroachment.  
4.6 Develop and implement a systematic programme of flood control measures in urban communities.  
4.9 Prepare and implement coastal management plans to effect coastal re-vegetation and erosion control of denuded and
<table>
<thead>
<tr>
<th>Action Areas</th>
<th>Policy Initiative</th>
</tr>
</thead>
</table>
| **Action Area 5: Planning and management of urban growth and sprawl** | 5.1 Ensure that investments and development will consistently and increasingly be directed towards targeted counter magnet growth areas.  
5.2 Probe and establish an effective integrated planning system for greater metropolitan areas which embraced different political districts.  
5.3 Ensure adoption and implementation of the recommendations of the LUPMP regarding planning legislation and development guidelines. |
| **Action Area 6: Urban infrastructure and services** | 6.1 Assess infrastructure needs of urban areas and mobilise resources to support infrastructural development.  
6.2 Improve delivery and management of urban services, social and economic infrastructure and services (including health, education, water, sanitation, energy, transport).  
6.3 Guide and manage investments in all relevant transport modes for efficient and effective intra and inter-city transport development.  
6.4 Promote efficient and effective public transport systems.  
6.7 Provide infrastructure and services on the basis of national, regional and district spatial development frameworks and urban structure plans. |
| **Action Area 7: Adequate and affordable housing** | 7.1 Provide a congenial environment for private sector delivery of affordable housing.  
7.4 Upgrade slums and dilapidated housing stock especially in urban areas selected as growth poles. |
| **Action Area 11: Research urban and regional development** | 11.1 Strengthen the capacity of research institutions and other bodies concerned with urban and regional development.  
11.2 Encourage urban research that has immediate bearing on urban development problems and needs. |
8 Implementation Plan

The implementation plan is aimed at creating a platform from which implementation can take place within the existing institutional framework. The plan in general spans a 20-year period and projects have been identified within this timeframe. However, the focus is to identify projects (mostly planning) which will lead to “action on the ground” within the next 5 years. Also, these projects will pursue a common and integrated goal to provide a strong regional development framework on the ground which will enable and facilitate localised investment, as well as provide a stable and functional region.

The cost estimates in the plan are rough, indicative estimates to denote the extent of the budget requirements only. To aid decision making, the more important, priority projects are shown in pink.

Also implementation plans should be annually updated. This allows the plans and budgets to be incrementally expanded. What that does is allow for new projects to be included annually, for completed projects to be removed and the programme to be expanded year-on-year.
8.1 Land Use

Table 8.1: Land Use Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
</table>
| Establish a Metropolitan Agency  | • Investigate metropolitan management agency alternatives.  
• Prepare a strategy to establish an agency.  
• Obtain buy-in for the establishment of a metropolitan agency.  
• Prepare an implementation plan.                                                                                                                                   | - Regional Coordinating Council  
- MMDAs                                                                                                           | 1-5                         | 2.5 million          |
| Establish Market Town Municipalities | • Investigate feasibility to establish 8 market town municipalities.  
• Prepare a strategy to establish municipalities.  
• Obtain buy-in for the establishment of municipalities.  
• Prepare implementation plan.                                                                                                                                       | - MMDAs                                                                                           | 1-5                         | 4 million          |
| Planning offices upgrade         | Upgrade all regional, district and municipal planning offices to achieve high levels of competency and service delivery, i.e. GIS systems, printing facilities, etc.                                           | - Regional Coordinating Council  
- LUSPA  
- MMDAs                                                                                                           | 1-3                         | To be determined     |
| Information Bureau               | Establish comprehensive and integrated information bureaus at Accra and Sege                                                                                                                                | - Regional Coordinating Council  
- MMDAs                                                                                                           | 1-5                         | 10 million          |
| Large-scale topo-cadastral mapping | Obtain high quality topo-cadastral mapping for the total region to include 2 meter contour intervals, registered cadastral information on ortho photo basis. (1:2500 scale to 1:10 00)                      | - MMDAs                                                                                           | 1-5                         |                      |
| Special Local Plans             | Prepare Special Local Plans for the following:  
• Jamestown  
• Usshertown                                                                                                                                                                                                 | - Affected MMDAs                                                                | 3-6                        | 2 million          |
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure Plans</td>
<td>Prepare structure plans for each metropolitan, municipal and district assembly in terms of the Manual for the Preparation of Spatial Plans, 2011</td>
<td>- Regional Coordinating Council&lt;br&gt;- MMDAs&lt;br&gt;- LUSPA</td>
<td>2-6</td>
<td>1.5 million per plan</td>
</tr>
<tr>
<td>Growth Management System</td>
<td>Develop a metropolitan and rural growth management system.</td>
<td>- District Assemblies&lt;br&gt; -</td>
<td>2-3</td>
<td>3 million</td>
</tr>
<tr>
<td>Special local plans</td>
<td>• La&lt;br&gt;• Area defined by Ring Road West / Winneba Road/ Samaneala / Coast&lt;br&gt;• Tema New Town&lt;br&gt;• Mobole Secondary Node&lt;br&gt;• New Prampram North Secondary Node&lt;br&gt;• Katamanso, Mokola and Kaneshie market precincts</td>
<td>- Affected MMDAs</td>
<td>3-6</td>
<td>1.5 million</td>
</tr>
<tr>
<td>Structure Plans of the proposed Airport</td>
<td>Prepare Structure Plan for the proposed airport in order to reserve bulk services and transport routes and manage premature settlement</td>
<td>- Regional Coordinating Council&lt;br&gt;- MMDAs&lt;br&gt;- LUSPA</td>
<td>4</td>
<td>3 million</td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CDs)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Review of the 2017 RSDF</td>
<td>Review RSDF to determine levels of implementation and to improve and broaden data basis</td>
<td>- Regional Coordinating Council - MMDAs - LUSPA</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Update and Review Structure Plans (Spatial Local Plans)</td>
<td>Review Structure Plans (Metropolitan, municipal and district) to determine levels of implementation and to improve and broaden data basis</td>
<td>- Regional Coordinating Council - MMDAs - LUSPA</td>
<td>11-14</td>
<td></td>
</tr>
</tbody>
</table>

MMDAs: Metropolitan, Municipal and District Authorities  
LUSPA: Land Use and Spatial Planning Agency
### 8.2 Environmental Sector

**Table 8.2: Environmental Implementation Projects**

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Natural Resource Inventory</td>
<td>A programme to map all natural resource in GAR, with associated value in terms of ecological services and community utilisation requirements is needed at district level in order to adequately manage and monitor resource depletion.</td>
<td>MMDAs</td>
<td>1-5</td>
<td>6 Million</td>
</tr>
<tr>
<td>Centralised Water Quality Monitoring</td>
<td>A centralised water quality monitoring programme / committee needs to be establish as these resources cross boundaries. All districts and other regions should provide information into this programme / committee to improve the ability to identify sources of pollution and take necessary steps to address these.</td>
<td>Water Resources Commission and the Ministry of Water Resources, Works and Housing.</td>
<td>1-5</td>
<td>1 Million</td>
</tr>
<tr>
<td>Open Drain Policy Reform</td>
<td>Policy / by-laws either at district or regional level needs to be developed for the prohibition of developing new open drains in urban areas.</td>
<td>MMDAs</td>
<td>1-3</td>
<td>N/A</td>
</tr>
<tr>
<td>Sustainable Fishing and Farming Practices</td>
<td>The hosting of programmes for fisherman and farmer education and small business development on how to reduce exploitation and destructive practices.</td>
<td>MMDAs</td>
<td>1-3</td>
<td>300 000</td>
</tr>
<tr>
<td>Floodplain Prevention, Relocation and Rehabilitation</td>
<td>A programme must be developed in order to prevent new development and to quantify the cost and effects of the relocation of housing located in floodplains (to reduce flooding impacts) as well as the rehabilitation of floodplains (to increase flood attenuation).</td>
<td>MMDAs</td>
<td>1-5</td>
<td>500 000</td>
</tr>
<tr>
<td>Sustainable Harvesting Programme</td>
<td>A programme should be established to assist communities to undertake sustainable practises such as sustainable firewood harvesting.</td>
<td>MMDAs</td>
<td>1-3</td>
<td>200 000</td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CDs)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Seismic Resilience Policy Development</td>
<td>Areas of high and low seismic activity to be integrated into policy and legislation to ensure that these areas are considered during development and the appropriate mitigations are undertaken</td>
<td>- National Legislature</td>
<td>5-20</td>
<td>N/A</td>
</tr>
<tr>
<td>Climate Resilient Infrastructure Programme</td>
<td>Developing climate resilient infrastructures and taking into consideration climate risk in design stage of roads etc., infrastructure improvements for correct drainage and improvement of water supply systems to ensure potable water supply during a flood or drought</td>
<td>- Infrastructure development entities (e.g. GWC)</td>
<td>5-20</td>
<td>N/A (as part of infrastructure budget)</td>
</tr>
<tr>
<td>Sustainable Farming Programme</td>
<td>A programme should be established to assist communities to undertake sustainable practises such as Climate Smart Agriculture.</td>
<td>- Regional Coordinating Council MMDAs</td>
<td>1-3</td>
<td>200 000</td>
</tr>
<tr>
<td>Formalise Artesian Fishing</td>
<td>Potential programme to include artesian fishing into the formal fishing economy</td>
<td>- Regional Coordinating Council MMDAs</td>
<td>1-5</td>
<td>250 000</td>
</tr>
<tr>
<td>Improve Fishing Facilities</td>
<td>Development of a plan to formalise fish landing sites and improve required fishing facilities</td>
<td>- Regional Coordinating Council MMDAs</td>
<td>5-20</td>
<td>500 000</td>
</tr>
<tr>
<td>Water Tourism</td>
<td>Develop a plan to rehabilitate the hydrological system and develop water activity tourism such as bird and other wildlife watching; fishing, water sport and recreation</td>
<td>- Regional Coordinating Council MMDAs</td>
<td>5-20</td>
<td>100 000</td>
</tr>
<tr>
<td>Beach Clean Up Programme</td>
<td>Beach clean-up will provide the opportunity to develop the GAR coastline into a possible tourist attraction, increasing tourism growth in the area</td>
<td>- Regional Coordinating Council</td>
<td>1-5</td>
<td>500 000</td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CDs)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Shoreline Stabilization Plan</td>
<td>A plan to stabilise the shoreline in areas that are prone to erosion will prevent further erosion and possibly protect infrastructure</td>
<td>- MMDAs</td>
<td>1-5</td>
<td>2 Million</td>
</tr>
<tr>
<td>Eco-tourism Development</td>
<td>A programme to identify and plan for the rehabilitation of unique ecological features, such as sacred groves, to increase eco-tourism potential of the GAR</td>
<td>- Regional Coordinating Council - MMDAs</td>
<td>5-20</td>
<td>200 000</td>
</tr>
<tr>
<td>Agriculture Best Practice Guidelines</td>
<td>Development of guidelines to ensure application of appropriate agricultural practices</td>
<td>- MOFA</td>
<td>5-20</td>
<td>150 000</td>
</tr>
<tr>
<td>Promotion of Existing Programmes</td>
<td>Programmes such as the Reduced Emissions from Deforestation and Forest Degradation plus (REDD+) and Man and Biosphere (MAB) should be utilise to improve the natural environment and the potential benefits within the GAR. Knowledge on these programmes can be developed through training and involvement in such programmes.</td>
<td>- MMDAs</td>
<td>1-3</td>
<td>100 000</td>
</tr>
<tr>
<td>District Climate Change Mitigation and Adaptation</td>
<td>District level climate change mitigation and adaption strategies must be developed in order to plan for and implement requirements for climate change</td>
<td>- Ministry of Local Government and Rural Development - MMDAs</td>
<td>5-20</td>
<td>1 Million</td>
</tr>
<tr>
<td>Heritage Preservation Plan</td>
<td>Development of a heritage preservation plan which:</td>
<td>- Ministry of Tourism, Culture and Creative Arts</td>
<td>1-5</td>
<td>2 Million</td>
</tr>
<tr>
<td></td>
<td>• Records all cultural heritage resources;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Evaluates resources form either preservation or development; and</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Implementation Plan – Environmental

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Development of a District level Heritage Framework which sets norms and standards for the identification, protection, conservation and promotion of heritage resources within the district.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*MMDAs: Metropolitan, Municipal and District Authorities

*MOFA: Ministry of Food and Agriculture*
### 8.3 Economic Environment

#### Table 8.3: Economic Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
</table>
| GAR Economic Growth and Development Strategy | A comprehensive economic growth and development strategy is required to provide a detailed knowledge base, supplemented by appropriately sophisticated analytical instruments that would provide a framework for sustained, effective and facilitative economic interventions by various organs of state. Detailed sectoral and sub-sectoral analyses are required to inform such a plan. Extensive primary research would have to be conducted to yield the required level of detail. | - Regional Coordinating Council  
- Ministry of Local Government and Rural Development  
- National Development Planning Commission | 1-3 | 1.5 million GHC |
| GAR Regional Tourism Market Plan | A regional tourism market plan is needed, including the development of tourism and associated infrastructure across the spectrum of opportunities identified as part of the tourism cluster. | - Regional Coordinating Council  
- Ministry of Tourism, Culture and Creative Arts | 1-3 | 500 000 GHC |
| GAR Industrial Development Strategy | An industrial development strategy needs to be compiled, similarly founded on comprehensively detailed sectoral and sub-sectoral analyses, supplemented with:  
- Industrial cluster, and  
- Associated value chain analyses. | - Regional Coordinating Council | 3-5 | 500 000 GHC |
<p>| Informal Sector Plan | Appropriate plans need to be put in place to ensure an increased | - Regional | 2-5 | 500 000 GHC |</p>
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>conversion rate of informal localised business and micro-survivalist enterprises into formal, small and medium sized mainstream business enterprises.</td>
<td>Coordinating Council - National Government</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 8.4 Transportation

#### Table 8.4: Transportation Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
</table>
| Mobility Improvements on existing Major Road Network | Mobility improvement studies for:  
- Road N1;  
- Road N2;  
- Road N4; and  
- Road N6 | - Ghana Highway Authority | 2 and 3 | 1.8 Million per year for 2 years |
| Mobility Improvement Projects | Mobility Improvement Projects:  
Annual allowance for implementation projects which includes design and construction implementation | - Ghana Highway Authority | 4, 5, 6, 7 and 8 | 35 Million per year for 5 years |
| R40: Determine and Secure Road reserve | Preliminary Design for Road R40 to be a Class 2 road to determine Road reserve and access requirements to be secured and protected | - Ghana Highway Authority | 2 | 2 Million |
| Primary Rural Road Network: Determine and secure Road reserves | Primary Rural Road Network Programme:  
- Route alignment determination and Preliminary design | - Department of Feeder Roads | Continuous from year 2 | 1.5 Million per year for 4 years; thereafter: 1 Million per year |
| Primary Rural Road Network: Detail Design and Implementation | Primary Rural Road Network programme:  
- Detail Design and Implementation | - Department of Feeder Roads | Continuous from year 2 | 30 Million Per year (10km per year) for 4 years; thereafter: 15 Million per year |
| New East-West Metropolitan Express Way: | New East-West Metropolitan Express Way:  
- Route Determination and Preliminary Design | - Ghana Highway Authority | 2 and 3 | 2 Million |
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route Determination, and Preliminary Design</td>
<td>New East-West Metropolitan Express Way:</td>
<td>- Ghana Highway Authority</td>
<td>5, 6 and 7</td>
<td>850 Million</td>
</tr>
<tr>
<td></td>
<td>• Detail Design and Implementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New East-West Metropolitan Express Way:</td>
<td>New East-West Outer Mobility route:</td>
<td>- Ghana Highway Authority</td>
<td>4</td>
<td>2 Million</td>
</tr>
<tr>
<td>Detail Design and Implementation</td>
<td>• Route Determination and Preliminary Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New East West Outer Mobility route: Route Determination</td>
<td>New East West Outer Mobility route:</td>
<td>- Ghana Highway Authority</td>
<td>8</td>
<td>3 Million</td>
</tr>
<tr>
<td>Detail Design</td>
<td>• Detail Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New East West Outer Mobility route: Construction</td>
<td>New East West Outer Mobility route:</td>
<td>- Ghana Highway Authority</td>
<td>10, 11 and</td>
<td>1,2 Billion</td>
</tr>
<tr>
<td>Implementation</td>
<td>• Construction Implementation</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Commuter Rail: Accra-Amasaman Upgrade: Preliminary</td>
<td>Commuter Rail: Accra-Amasaman Upgrade:</td>
<td>- Ministry of Transport</td>
<td>2</td>
<td>2 Million</td>
</tr>
<tr>
<td>Design</td>
<td>Upgrade to double line and Station upgrades: Preliminary Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter Rail: Accra-Amasaman Upgrade:</td>
<td>Commuter Rail: Accra-Amasaman Upgrade:</td>
<td>- Ministry of Transport</td>
<td>3, 4 and 5</td>
<td>100 Million</td>
</tr>
<tr>
<td>Detail Design and Implementation</td>
<td>Upgrade to double line and Station upgrades:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detail Design and Implementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter Rail: Tema-Achmitota Upgrade: Preliminary</td>
<td>Commuter Rail: Tema-Achmitota Upgrade:</td>
<td>- Ministry of Transport</td>
<td>3</td>
<td>2 Million</td>
</tr>
<tr>
<td>Design</td>
<td>Upgrade to double line and Station upgrades: Preliminary Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter Rail:</td>
<td>Commuter Rail: Tema-Achmitota Upgrade:</td>
<td>- Ministry of</td>
<td>4, 5 and 6</td>
<td>110 Million</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4, 5 and 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CDs)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Achmitota Upgrade: Detail Design and Implementation</td>
<td>Upgrade to double line and Station upgrades Detail Design and Implementation</td>
<td>Transport</td>
<td>-</td>
<td>1.5 Million</td>
</tr>
<tr>
<td>Trans-Ecowas Rail Line including Tema Link: Route determination and Preliminary Design</td>
<td>Trans-Ecowas Rail Line including Tema Link: • Single Line • Route determination and Preliminary Design</td>
<td>Ministry of Transport</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Trans-Ecowas Rail Line Including Tema Link: Detail Design and Implementation</td>
<td>Trans-Ecowas Rail Line: Only Tema Link to Inland Dry Port: • Single Line • Detail Design and Construction Implementation</td>
<td>Ministry of Transport</td>
<td>6 and 7</td>
<td>54 Million</td>
</tr>
<tr>
<td>BRT: Route 3: Adenta to CBD</td>
<td>BRT Implementation: • Route 3: Adenta to CBD • Design and Construction</td>
<td>Ministry of Transport</td>
<td>2, 3 and 4</td>
<td>125 Million</td>
</tr>
<tr>
<td>BRT: Route 4: Ashaiman to Ring Road</td>
<td>BRT Implementation: • Route 4: Ashaiman to Ring Road • Design and Construction</td>
<td>Ministry of Transport</td>
<td>3, 4, 5 and 6</td>
<td>185 Million</td>
</tr>
<tr>
<td>BRT: Route 6: Achimota to Labadi</td>
<td>BRT Implementation: • Route 6: Achimota to Labadi • Design and Construction</td>
<td>Ministry of Transport</td>
<td>4 and 5</td>
<td>60 Million</td>
</tr>
<tr>
<td>Rural Bus Service</td>
<td>Planning and Operational Plan for a Rural Bus service</td>
<td>Ministry of Transport</td>
<td>2</td>
<td>1.2 Million</td>
</tr>
<tr>
<td>BRT: Route 1: Kasoa to CBD</td>
<td>BRT Implementation: • Route 1: Kasoa to CBD • Design and Construction</td>
<td>Ministry of Transport</td>
<td>2, 3 and 4</td>
<td>115 Million</td>
</tr>
<tr>
<td>Maritime Infrastructure</td>
<td>Provision of landing beaches/fishing harbours Provision of cooling Facilities at landing sites</td>
<td>Ministry of Fisheries and</td>
<td>4, 5, 6 and 7</td>
<td>30 Million per year for 4 years</td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CD$)</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>----------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Freight Transport</td>
<td>Inland Dry Port at Modol node:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Planning and securing of land for the establishment of the Inland Dry Port</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greater Accra Regional Council</td>
<td>2</td>
<td>1.2 Million</td>
</tr>
<tr>
<td>Aviation</td>
<td>Provision of High Speed Rail link to new Planned International Airport:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Route Determination and securing of land</td>
<td>Ministry of Transport</td>
<td>5</td>
<td>1.2 Million</td>
</tr>
<tr>
<td>Aviation</td>
<td>Provision of High Speed Rail link to new Planned International Airport:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Design and construction implementation</td>
<td>Ministry of Transport</td>
<td>17, 18 and 19</td>
<td>120 Million</td>
</tr>
</tbody>
</table>
8.5 Engineering Services

The costing, or even estimating the cost, of infrastructure is impossible until such time that the detailed Master Plans have been developed. Without the Master Plans in place the scope and extent of work is unknown and therefore the cost of projects cannot be predicted.

8.5.1 Water Services

Table 8.5: Water Services Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (Years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Plan</td>
<td>Determine the status quo of the current bulk water infrastructure. This will highlight the supply capabilities of the existing networks and treatment plants. This in turn will assist in determining the upgrade required to support the current and future demands.</td>
<td>- GWCL / GWC</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- District Assemblies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve Water Supply Systems</td>
<td>The upgrading and optimization of existing water supply schemes.</td>
<td>- CWSA</td>
<td>2-5, continuous process</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- WRC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- GWCL / GWC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- District Assemblies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrading of Existing Water Infrastructure</td>
<td>Increase capacity of water treatment facilities and water networks in order to accommodate the current and future water demands.</td>
<td>- District Assemblies</td>
<td>2-5, continuous process</td>
<td></td>
</tr>
<tr>
<td>Desalination of Sea Water</td>
<td>The identification, investigation and establishment of additional water source to supply current and future water demands.</td>
<td>- CWSA</td>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- WRC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- GWCL / GWC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification Of Additional Surface Water Sources</td>
<td>The identification, investigation and establishment of additional water source to supply current and future water demands.</td>
<td>- GWCL / GWC</td>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td>Identification And Development Of Ground Water</td>
<td>The identification, investigation and establishment of additional water source to supply current and future water demands.</td>
<td>- WRC</td>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- GWCL / GWC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>Description</td>
<td>Responsible Bodies</td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Optimisation of existing surface water resources</td>
<td>Re-evaluation of the current operations at existing water supply sources. This will aid in determining the schemes / practices which can optimize water extraction from these existing surface water sources.</td>
<td>WRC, GWCL / GWC</td>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>Introduce maintenance programs / protocols for existing and proposed water infrastructure.</td>
<td>District Assemblies</td>
<td>5-7</td>
<td></td>
</tr>
<tr>
<td>Public Awareness</td>
<td>Create public awareness on water conservation and the protection of water sources.</td>
<td>District Assemblies, WRC</td>
<td>1-continuous</td>
<td></td>
</tr>
<tr>
<td>Water Conservation and Demand Management</td>
<td>Establish water conservation management schemes / practices. Assess the current water demand management in order to highlights areas of concern.</td>
<td>WRC, GWCL / GWC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*CWSA: Community Water & Sanitation Agency  
GWCL / GWC: Ghana Water Company Limited  
WRC: Water Resources Commission*
### 8.5.2 Sanitation Services

#### Table 8.6: Sanitation Services Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
</table>
| Development/ Revision of sanitation policies and management practices | Assessment of the current sanitation management schemes / practices and how these schemes / practices can be fully optimised / utilised to accommodate the projected sewer flows. | - MLGRD  
- MWRWH  
- District Assemblies                                                                 | 1-3                                                                                       |                    |
| Public Awareness                                                      | Create public awareness on both the negative effects of poor sanitation management, sanitation facilities that lack maintenance etc., through the implementation of educational programs etc. | - MMDAs                                                                                   | continuous      |                    |
| Operation and Maintenance                                             | Introduce maintenance programs / protocols for existing and proposed sewer infrastructure.                                                             | - MLGRD  
- MMDAs                                                                                   | 5-7                                                                                       |                    |
| Sanitation Master plan                                                | Determine the status quo of the current bulk sewer infrastructure. This will highlight the sewer system capabilities of the existing networks and treatment plants. This in turn will assist in determining the upgrade required to discharge the current and future sewage. | - MLGRD  
- MWRWH                                                                                  | 1-3                                                                                       |                    |
| Increase the sanitation infrastructure coverage                         | Increase the coverage of the current sanitation infrastructure to discharge sewer flows generated from a greater number of people/activities (commercial, industrial and institutional). | - MMDAs                                                                                   | 3-5                                                                                       |                    |
| Construction of Sewer treatment plants                                | The establishment of new sewage treatment plants to accommodate the current and projected sewer flows.                                               | - MLGRD  
- MWRWH                                                                                  | 2-7                                                                                       |                    |
| Construction of Additional Sanitation Facilities                      | The installation of new sanitation facilities to cater for current and future sewer flows.                                                           | - MLGRD  
- MWRWH  
- MMDAs                                                                               | 3-7                                                                                       |                    |

MWRWH: Ministry of Water Resources, Works and Housing  
MLGRD: Ministry of Local Government and Rural Development  
MMDAs: Metropolitan, Municipal and District Authorities
### 8.5.3 Stormwater Services

Table 8.7: Stormwater Services Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation and Maintenance</td>
<td>Introduce maintenance programs and the establishment of stormwater infrastructure policies to allow for stormwater system to run efficiently and reduce the amount of waste in stormwater systems.</td>
<td>- MLGRD</td>
<td>5-7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MMDAs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Awareness</td>
<td>Create public awareness on the status quo of the current stormwater facilities, the implication of a lack of maintenance and provide recommendation on how the stormwater system can be improved install educational programs etc.</td>
<td>- MLGRD</td>
<td>continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MMDAs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stormwater Master Plan</td>
<td>Determine the status quo of the current bulk stormwater infrastructure. This will highlight the stormwater system capabilities of the existing networks and stormwater infrastructure. This in turn will assist in determining the upgrade required to discharge the current and future stormwater runoff into receiving water bodies.</td>
<td>- MMDAs</td>
<td>continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MLGRD</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MWRWH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable Drainage Systems (SuDS) and the creation of greenfield spaces</td>
<td>Provide an alternative to conventional stormwater drainage systems.</td>
<td>- MLGRD</td>
<td>3-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MWRWH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MMDAs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection of undisturbed land</td>
<td>Protection of Green Belt areas, natural low lying wetlands, conservation areas and develop policies to enhance these natural landscapes to promote stormwater infiltration.</td>
<td>- Ministries</td>
<td>1-3</td>
<td></td>
</tr>
</tbody>
</table>

MLGRD: Ministry of Local Government and Rural Development  
MMDAs: Metropolitan, Municipal and District Authorities  
MWRWH: Ministry of Water Resources, Works and Housing
### 8.5.4 Solid Waste Services

Table 8.8: Solid Waste Services Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Waste Master Plan</td>
<td>The assessment of the status quo of the solid waste management in the GAR, so as to improve the development policies/practices that will accommodate current and future solid waste from the increased population and activity in the GAR.</td>
<td>- MMDAs &lt;- MLGRD - MWRWH</td>
<td>continuous</td>
<td></td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>Introduce maintenance programs/schedules for the removal of solid waste.</td>
<td>- MMDAs</td>
<td>continuous</td>
<td></td>
</tr>
<tr>
<td>Public Awareness</td>
<td>Create public awareness on both the adverse effects of solid waste in civil infrastructure facilities; install educational programs, increased communication through media/telecommunications.</td>
<td>- MMDAs</td>
<td>1-3, continuous process</td>
<td></td>
</tr>
<tr>
<td>New Solid Waste Management Schemes</td>
<td>The upgrading of current solid waste management practices and introduction of new solid waste management schemes/practices.</td>
<td>- MLGRD - MWRWH - MMDAs</td>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td>Environmental and Land-Use Policies</td>
<td>The creation of strict environmental policies to minimise the impact of solid waste on society and the environment.</td>
<td>- MLGRD</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>Optimization of Solid waste (Hierarchy)</td>
<td>Optimization of solid waste before it is disposed. The aim first to eliminate waste, then to optimize solid waste material before it is disposed of and lastly to dispose of unwanted waste in an cost efficient and environmentally friendly way.</td>
<td>- MLGRD</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>Public-Private Participation</td>
<td>Further extend the PPP initiative to handle the solid waste management on a regional scale.</td>
<td>- Priv. companies like Zoomlion</td>
<td>1-4</td>
<td></td>
</tr>
<tr>
<td>Construction of disposal sites</td>
<td>The installation of new solid waste disposal facilities to cater for current and future solid waste generation.</td>
<td>- MLGRD - MWRWH - MMDAs</td>
<td>3-7</td>
<td></td>
</tr>
</tbody>
</table>

*MWRWH: Ministry of Water Resources, Works and Housing
MLGRD: Ministry of Local Government and Rural Development*
MMDAs: Metropolitan, Municipal and District Authorities
### 8.5.5 Telecommunication Services

**Table 8.9: Telecommunication Services Implementation Projects**

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further Expansion Of The Fixed Line And Mobile Technology</td>
<td>Further enhancement and expansion of the fixed line telecommunication and mobile service providers.</td>
<td>- Service Providers</td>
<td>1-3, continuous process</td>
<td></td>
</tr>
</tbody>
</table>
### 8.6 Energy

#### Table 8.10: Energy Implementation Projects

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A different approach to distribution planning &amp; demand forecasting</strong></td>
<td>• Change from current methodology of load forecast based on compound annual growth rates to detailed network development plan (NDP) based on (1) network modelling for each substation, (2) actual historical data and (3) forecasting based on inter alia, land use profiles. This allows for a more effective distribution planning and management.</td>
<td>- ECG (close coordination with GRIDCO)</td>
<td>1-1.5</td>
<td>~1.5 million</td>
</tr>
<tr>
<td></td>
<td>• The above distribution planning strategy must be coupled with a strict policy for maximum demand allocation in areas based on land use zoning, historical data and ECG available capacity. That is an ADMD (After Diversity Maximum Demand) limit must be declared per stand or property to allow for a better planning of services per area. This ADMD will define a limit for services that can be allowed prior to major upgrade of substations. E.g. This has the implication that certain areas may have to be declared as no-slum zones. i.e. a maximum number of service connections per stands will have to be enforced.</td>
<td>- ECG &amp; Physical Planning Departments</td>
<td>As part of timeline above</td>
<td>As part of budget above</td>
</tr>
<tr>
<td></td>
<td>• Coordination of application process such that comments from ECG are obtained as a pre-requisite. i.e. Approvals (for developments, rezoning etc.) that come through the town planning / city development have to indicate clearly how each property will be serviced (whether ECG or privately) and the necessary ECG approvals submitted as part of the application.</td>
<td>- ECG &amp; Physical Planning Departments</td>
<td>As part of proposed Metropolitan Agency function</td>
<td>As part of proposed Metropolitan Agency function</td>
</tr>
<tr>
<td><strong>Generation projects that affect entire region</strong></td>
<td>• 180 MW Sunon-Asogli (Phase 2 Stage 2) - This is the second phase of the 360 MW combined cycle project. 180 MW was assumed to be available in 2016 and the second 180 MW is assumed to be</td>
<td>- Sunon-Asogli</td>
<td>As per project plan ~ 2017 online</td>
<td>Active project – no info supplied</td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CDs)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>online in 2017.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>•</td>
<td>340 MW Cenpower Project– Construction for this project has commenced and based on the project timeline, the plant should be commissioned by fourth quarter of 2017. However in this analysis the plant is assumed to be available from January 2018.</td>
<td>Cen Power</td>
<td>As per project plan ~ 2018 online</td>
<td>Active project – no info supplied</td>
</tr>
<tr>
<td>•</td>
<td>The current 2016 National Electricity Plan (GRIDCO) indicates a shortage of 1200MW over 2017 -2021 for the country as a whole. Upon review of the ECG planned demand and taking the RSDF into account, the GAR deficit over this same period is 320 MW. Work should commence to ensure that the additional generation capacity required over the period 2017 - 2021 is added into the Ghana power system in a timely manner (2017, 2019, 2021) for reliable power supply. An additional 17% annual increase in demand applies over the period 2022-2037 as per the RSDF.</td>
<td>VRA, IPPs etc. under guidance of Energy Ministry</td>
<td>2017-2037 (ongoing)</td>
<td>2017-2021 = 303 million (at a rate of 851k per MVA, assuming good power factor 0.9 and minimal losses) budget to increase by 17% annually until 2037</td>
</tr>
<tr>
<td></td>
<td>Transmission projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>•</td>
<td>25.7km; 488MVA; 161kV double circuit Twin-Tern conductor upgrade of the Volta-Achimota lines:</td>
<td>GRIDCO</td>
<td>Estimation 4 to 5 pending expropriation, EIA’s etc.</td>
<td>~24 million</td>
</tr>
<tr>
<td>•</td>
<td>Upgrading of transmission lines in the Volta-Accra East Achimota corridor from 213 MVA to a 488 MVA. This would increase the evacuation capacity from Tema generation hub to the load centre of Accra. This is especially necessary to ensure the evacuation of generation from the new thermal power plants in Tema, namely Karpower (225 MW), Sunon-Asogli Phase-2 (180MW) and the Kpone Thermal Power Plant (KTPP - 200 MW).</td>
<td>GRIDCO</td>
<td>Estimation 4 to 5 pending</td>
<td>~11 million</td>
</tr>
<tr>
<td>•</td>
<td>12km; 488MVA; 161kV double circuit Twin-Tern conductor upgrade of the Achimota – Mallam lines:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Implementation Agents</td>
<td>Timing (years)</td>
<td>Est. Cost (Ghana CDs)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>---------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>• Upgrade of Achimota–Mallam 161 kV transmission line conductor from 170 MVA to 488 MVA, to improve bus voltages at Achimota and adjacent substations. It would also reduce overall transmission losses and lines loading on the NITS. This project has already been awarded on contract.</td>
<td></td>
<td>expropriation, EIA’s etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 161 kV Collector Substation to be located in Tema.</td>
<td>- GRIDCO</td>
<td>+/- 5</td>
<td>No MVA provide</td>
<td></td>
</tr>
<tr>
<td>• 161 kV Accra Central Gas Insulated Substation located in Accra.</td>
<td>- GRIDCO</td>
<td>+/- 5</td>
<td>No MVA provide</td>
<td></td>
</tr>
<tr>
<td>• 330/161 kV Accra Fourth Bulk Supply Point (A4BSP) Substation located at Pokuase (364 MVA)</td>
<td>- GRIDCO</td>
<td>+/- 5</td>
<td>~23 million</td>
<td></td>
</tr>
<tr>
<td>• 10km 161kV double circuit Mallam-A4BSP Transmission line. Construction of A4BSP 330kV substation with a 161kV, double circuit twin bundle (364x2 MVA) link to Mallam BSP. This would increase the reliability of supply to Accra and increase transfer capacity between the generation hub of Aboadze and Tema to the load Centre of Accra.</td>
<td>- GRIDCO</td>
<td>Estimation 4 to 5 pending expropriation, EIA’s, etc.</td>
<td>~9 million</td>
<td></td>
</tr>
<tr>
<td>• 330kV Dawa Collector Substation in Dawa.</td>
<td>- GRIDCO</td>
<td></td>
<td>No MVA provided</td>
<td></td>
</tr>
</tbody>
</table>

Additional NEW projects RSDF node specific.

<p>| • New 330kV Transmission line (+/-60km) linking the following nodes to GRID: New Airport node and Dawsi node areas, Lanaw nodes. Line to make provision for each node to have long term capacity of 20MVA for the target year. | - GRIDCO | +/- 5 to 6 pending expropriation, EIA’s, etc. | +/-55 million |
| - 1x 330kV BSP to supply New airport node and the Dawsi node areas totalling a minimum of 40MVA firm capacity (10MVA to be reserved for industries in line with &quot;one factory one district strategy&quot;) | - GRIDCO &amp; IPP | +/-5 | +/-5 million |
| - 1 x 303kV BSP to supply Lanaw node and surrounding areas with firm capacity of 20MVA. 5MVA to be reserved for | - GRIDCO | +/-5 | ~3 million |</p>
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Implementation Agents</th>
<th>Timing (years)</th>
<th>Est. Cost (Ghana CDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Current GRID Plan 3330kV Transmission line (+/-100km) linking Volta substation in Tema going into Volta Region. The Grid Plan indicates that the line will pass Prampram, Old Nongu, through Big Ada into Volta Region. This route makes the line the ideal option in supplying City of Hope &amp; surrounds, Prampram, Old Nongu and their surrounds.</td>
<td>GRIDCO</td>
<td>Actual Project on Current Grid Plan (no timeline given)+/- 6 years</td>
<td>+/- 93 million</td>
<td></td>
</tr>
<tr>
<td>- 1 x 330kV Substation linking the above transmission line with the current Grid Planned one - while also servicing Sege node and surrounds (minimum of 20MVA firm capacity)</td>
<td>GRIDCO</td>
<td>+/-5</td>
<td>+/-3 million</td>
<td></td>
</tr>
<tr>
<td>- 1 x 330kV BSP supporting City of Hope and surrounds(20MVA), Prampram, Kpone and other settlements on the eastern Tema (20MVA) including Old Nongu (20MVA) - total firm capacity of 40MVA.</td>
<td>GRIDCO &amp; IPP</td>
<td>+/-5</td>
<td>+/-5 million</td>
<td></td>
</tr>
<tr>
<td>- 1 x 330kV BSP to service Ada Foah and Kesse nodes at 20 MVA firm capacity each, i.e. minimum total capacity of 40MVA with 10 MVA reserved for industry.</td>
<td>GRIDCO</td>
<td>+/-5</td>
<td>+/-5 million</td>
<td></td>
</tr>
</tbody>
</table>

*capacities given above are minimum guideline values only. It expected that actual capacities shall be higher pending actual development and growth.*

ECG: Electricity Company of Ghana  
IPP: Independent Power Producers  
VRA: Volta River Authority  
GRIDCO: Ghana Grid Company Limited
9 References

9.1 Natural Environment

(a) Documents / Books


33. Odoi Danquah, I., 2013: Climate Change and it impacts on flooding in Accra-Greater Accra Metropolitan Assembly, Department of Civil Engineering, College of Engineering.


41. USAID, 2012: Climate Change Adaptation in Ghana.

42. USAID, 2013: Climate Change and Conflict in West African Countries, Findings from Lagos, Nigeria and Ghana, Accra, United States Agency for International Development.


(b) Internet Sources


9.2 Engineering Services and Infrastructure

(a) Documents

1. Rising through Cities in Ghana – Ghana Urbanization Review Overview Report

2. 33rd WEDC International Conference, Accra, Ghana, 2008 – Performance evaluation of the UASB sewage treatment plant at James Town (Mudor), Accra


5. Progress report on GEMA Medium Term Development Plan (MTDP) 2010-2013

6. Accra Metropolitan Medium Term Development Plan, 2014 - 2017

7. Tema Metropolitan Medium Term Development Plan, 2014 - 2017
17. La Dade Kotopon Municipal Medium Term Development Plan, 2014 - 2017
18. La-Nkwantanang Madina Municipal Medium Term Development Plan, 2014 - 2017
26. URBANIZATION AND FLOODING IN ACCRA, GHANA (by Kizito Afeku)

(b) Internet Sources

2. http://www.slideshare.net/abrude/wwrf29-template/5
9.3 Electrical Infrastructure

(a) Documents / Books

8. GRIDCO Network GRID Map.
13. ECG Geographical Layout for Accra East and Accra West (Dec 2015) (hard copy and dwg format).

9.4 Road Infrastructure and Transportation

(a) Documents

3. The Transport Master Plan Project in Greater Accra Region, 2016. Ministry of Transport – Greater Accra Regional Coordinating Council

(b) Internet Sources

9.5 Town Planning

(a) Documents / Books


5. Western Region Spatial Development Framework

6. Accra Metropolitan Medium Term Development Plan, 2014 - 2017

7. Tema Metropolitan Medium Term Development Plan, 2014 - 2017


17. La Dade Kotopon Medium Term Development Plan, 2014 - 2017

18. La-Nkwantanang Madina Medium Term Development Plan, 2014 - 2017


(b) Internet Sources


9.6 Population and Social Environment

(a) Documents / Books
3. Ghana Housing Profile, 2011. UN Habitat

(b) Internet Sources

9.7 Economic Environment

(a) Documents
8. Integrated business establishment survey. 2015. Ghana Statistical Service


(b) Internet Sources


9.8 Institutional Environment

(a) Documents


2. Land Use and Spatial Planning Act 2016, Act 925


(b) Internet Sources


Appendix A
Natural Open Space Plan
Appendix B
Investment Opportunities Plan
Appendix C
Rural – Nodal Influence Area Plan
Appendix D
Public Transport Plan
Roads Plan
Appendix E
Urban – Nodal Influence Area Plan
Appendix F
Housing Allocation Plan
Appendix G

Strategic Environmental Assessment Report (SEA)
This report, and information or advice, which it contains, is provided by GIBB (or any of its related entities) solely for internal use and reliance by its Client in performance of GIBB’s duties and liabilities under its contract with the Client. Any advice, opinions, or recommendations within this report should be read and relied upon only in the context of the report as a whole. The advice and opinions in this report are based upon the information made available to GIBB at the date of this report and on current South African standards, codes, technology and construction practices as at the date of this report. Following final delivery of this report to the Client, GIBB will have no further obligations or duty to advise the Client on any matters, including development affecting the information or advice provided in this report. This report has been prepared by GIBB in their professional capacity as Consulting Engineers. The contents of the report do not, in any way, purport to include any manner of legal advice or opinion. This report is prepared in accordance with the terms and conditions of the GIBB contract with the Client. Regard should be had to those terms and conditions when considering and/or placing any reliance on this report. Should the Client wish to release this report to a Third Party for that party's reliance, GIBB may, at its discretion, agree to such release provided that:

(a) GIBB’s written agreement is obtained prior to such release, and
(b) By release of the report to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against GIBB and GIBB, accordingly, assume no duties, liabilities or obligations to that Third Party, and
(c) GIBB accepts no responsibility for any loss or damage incurred by the Client or for any conflict of GIBB interests arising out of the Client’s release of this report to the Third Party.

GIBB (Pty) Ltd
Postal Address :
Contact Person :
Telephone No. :
Website : www.gibb.co.za
Physical Address :
Email Address :
Fax No. :