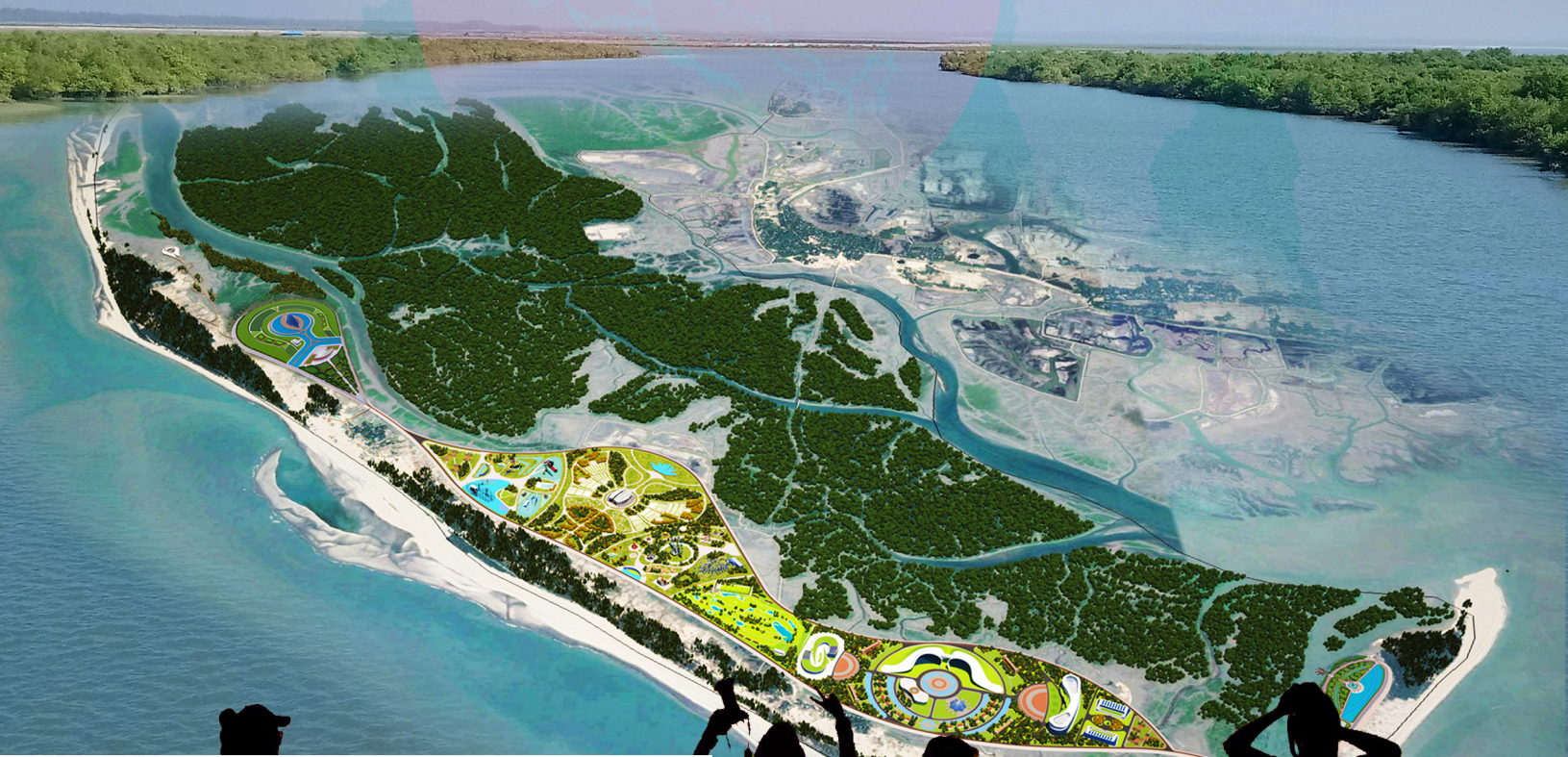




Government of the People's Republic of Bangladesh  
Bangladesh Economic Zones Authority (BEZA)

# Sonadia Eco-Tourism Park



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Master Plan and  
Development Plan  
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# Contents

List of tables .....	viii
List of exhibits .....	xii
List of abbreviations .....	xvi
Executive summary .....	1
Chapter - 1 .....	11
Introduction .....	11
1.1. Project background.....	11
1.2. The core objective of the SE-TP.....	13
1.3. Engagement project consultant.....	13
1.4. Scope of services.....	13
1.5. Site visit and stakeholder consultation meetings.....	15
1.6. The structure of the MP&DP report .....	19
Chapter - 2 .....	32
Detailed activities and approach methodology.....	32
2.1. Objectives of the assignment.....	32
2.2. Broad objectives of SE-TP .....	32
2.3. Study coverage .....	34
2.4. Approach methodology for the study .....	35
2.5. Work breakdown structure.....	36
Chapter - 3 .....	42
Tourism profile of Bangladesh, Cox's Bazar and its surrounding .....	42
3.1. Bangladesh tourism – an overview .....	42
3.2. Cox's Bazar - a major tourist attraction .....	42
3.3. Regional setting .....	43
3.4. Demographic profile .....	45
3.5. Economic profile.....	46
3.6. Tourism profile .....	46
3.6.1. Tourist spots/potentials of Cox's Bazar .....	47

<b>Chapter – 4</b> .....	49
<b>Conceptualisation and configuration of SE-TP including IRC-CoE&amp;IDC</b> .....	49
4.1. Need for the project.....	49
4.2. Eco-Tourism cluster concept.....	51
4.3. Focus of IRC-CoE&IDC .....	56
4.4. Strategies for the sustenance of the Eco-Tourism cluster.....	57
4.5. Objective enablers of SE-TP including IRC-CoE&IDC.....	58
4.6. Product differentiators .....	60
<b>Chapter - 5</b> .....	63
<b>Vision and mission of SE-TP including IRC-CoE&amp;IDC</b> .....	63
5.1. Development approach .....	63
5.2. Focus area, facilitators, enablers, linkages of the SE-TP including IRC-CoE&IDC.....	64
5.3. Key consideration .....	66
5.4. Goals and objectives .....	67
5.5. Vision .....	69
5.6. Mission.....	69
<b>Chapter - 6</b> .....	70
<b>Tourist survey and projection</b> .....	70
6.1. Preamble and approach for tourist survey and projection.....	70
6.2. Tourist spots and potential of Sonadia Island .....	70
6.3. Tourists survey.....	70
6.4. Bangladesh tourism performance on select indicators.....	71
6.4.1. Population projection.....	71
6.4.2. Baseline data and assumptions for tourist’s projection.....	72
6.4.3. Domestic tourists’ projection and expected domestic tourists’ footfall for SE-TP .....	72
6.4.4. International tourists’ projection and expected International tourists’ footfall for SE-TP.....	73
6.5. Summary of total tourists’ footfall to SE-TP.....	74
<b>Chapter - 7</b> .....	76
<b>Benchmarking - domestic and international comparable</b> .....	76
7.1. Categorisation.....	76
7.1.1. Distinct ecosystems having tourism as a major growth engine.....	76
7.1.2. International tourist attraction facilities.....	77
7.1.3. Tourism based EZs.....	78

7.1.4.	<i>International innovation &amp; research hubs</i> .....	80
7.2.	Considerations from benchmarking exercise.....	80
<b>Chapter - 8</b>	.....	<b>83</b>
<b>Site analysis</b>	.....	<b>83</b>
8.1.	Salient features.....	<b>83</b>
<b>Chapter – 9</b>	.....	<b>94</b>
<b>Transportation plan</b>	.....	<b>94</b>
9.1.	The preamble of developing a transportation plan.....	94
9.2.	Connectivity of Cox’s Bazar and connectivity between Cox’s Bazar and Sonadia Island.....	94
9.3.	Transport network within Sonadia Island.....	96
9.4.	Transport network with adjacent tourist spots .....	96
9.5.	Transport infrastructure .....	97
9.5.1.	<i>Status of road communication on Dhaka-Chittagong-Cox’s Bazar-Teknaf Corridor</i> .....	97
9.5.2.	<i>Upgrading and construction of new transport infrastructure</i> .....	97
9.5.3.	<i>Road access to Sonadia Island from Chittagong- Cox’s Bazar highway</i> .....	97
9.5.4.	<i>The road network within Cox’s Bazar city to facilitate tourist movement</i> .....	98
9.6.	Zone of influence of Cox’s Bazar tourism corridor.....	98
9.7.	Estimation of tourists for Cox’s Bazar for transportation planning .....	100
9.8.	Transport facilities.....	100
9.8.1.	<i>Transport facilities from Dhaka to Cox’s Bazar corridor</i> .....	100
9.8.2.	<i>Transport need of the people accommodated in the resettlement area</i> .....	101
9.8.3.	<i>Transportation between Cox’s Bazar and Sonadia Island</i> .....	101
9.8.4.	<i>Proposed road hierarchy and transport facilities within Sonadia Island</i> .....	102
9.9.	Review of cable car option for Sonadia Island .....	104
9.10.	Traffic management plan .....	105
9.10.1.	<i>Transport development approach</i> .....	105
9.10.2.	<i>Parking facilities and management</i> .....	105
9.10.3.	<i>Safety and security</i> .....	105
9.10.4.	<i>Transport related information for tourists</i> .....	105
<b>Chapter - 10</b>	.....	<b>106</b>
<b>Master plan of SE-TP</b>	.....	<b>106</b>
10.1.	Objectives of the master plan and planning framework.....	106
10.2.	Planning concept.....	108
10.3.	Planning considerations.....	108

10.4.	Multi-criteria considerations for shortlisting themes and attractions and responsiveness check.....	114
10.5.	Space allocation pattern.....	115
10.6.	Zones spotting .....	116
10.7.	Zoning plan.....	117
10.8.	Zones and components configuration.....	118
	10.8.1. Entrance zone.....	119
	10.8.2. Heritage and hospitality zone.....	120
	10.8.3. Knowledge centre zone.....	121
	10.8.4. Family entertainment zone.....	122
	10.8.5. Adventure zone .....	123
	10.8.6. Eco-science zone .....	124
10.9.	Zoning principles .....	125
10.10.	Sustainability and smart initiatives.....	126
10.11.	Amenity and utility area.....	126
<b>Chapter - 11 .....</b>		<b>128</b>
<b>Master plan of IRC-CoE&amp;IDC .....</b>		<b>128</b>
11.1.	Positioning of IRC-CoE&IDC.....	128
11.2.	Broad design considerations .....	130
11.3.	Thrust areas of IRC-CoEs.....	131
	11.3.1 Overview of GoB's life sciences sector.....	131
	11.3.2 Thrust segments of life sciences from IRC-CoE perspective.....	133
	11.3.3 Overview of GoB's alternative and renewable energy sector.....	134
	11.3.4 Thrust segments of alternative and renewable energy from IRC-CoE perspective.....	135
	11.3.5 Overview of GoB's information technology sector.....	135
	11.3.6 Thrust segments of IR-ITES and ICT from IRC-CoE perspective.....	138
	11.3.7 Overview of GoB's environment sector.....	139
	11.3.8 Thrust segments of the environment sector from IRC-CoE perspective.....	140
	11.3.9 Overview of GoB's design, engineering and consulting services.....	141
	11.3.10 Thrust segments of the consulting sector from IRC-IDC perspective.....	145
11.4.	IRC-CoE: focus, size, infrastructure proposed and likely occupant units.....	145
11.5.	IRC-IDC: focus, size, infrastructure proposed and likely occupant units .....	150
<b>Chapter - 12 .....</b>		<b>154</b>
<b>Infrastructure plan within SE-TP including IRC-CoE&amp;IDC .....</b>		<b>154</b>
12.1.	Purpose and objectives of the infrastructure plan .....	154
12.2.	Standards and codes for infrastructure planning.....	155
12.3.	Considerations for infrastructure plans .....	156

12.4.	SE-TP infrastructure assessment and estimation.....	169
12.5.	Specialised infrastructure in IRC-CoE&IDC.....	182
<b>Chapter - 13</b>	<b>.....</b>	<b>187</b>
<b>SE-TP off-site infrastructure and linkages</b>	<b>.....</b>	<b>187</b>
13.1.	Purpose and objective of off-site infrastructure .....	187
	<i>13.1.1. Approach road.....</i>	<i>187</i>
	<i>13.1.2. Power supply to SE-TP.....</i>	<i>188</i>
	<i>13.1.3. Water supply to SE-TP.....</i>	<i>189</i>
<b>Chapter – 14</b>	<b>.....</b>	<b>191</b>
<b>Environmental and social assessment</b>	<b>.....</b>	<b>191</b>
14.1.	Preamble .....	191
14.2.	Introduction.....	192
14.3.	Objectives .....	192
14.4.	The methodology of E&S review .....	192
14.5.	Description of the study area.....	192
14.6.	Description of the project environment.....	192
14.7.	Social baseline environment .....	192
14.8.	SE-TP including IRC-CoE&IDC development description .....	193
14.9.	Policy, legal, the regulatory and institutional framework.....	193
14.10.	Approach for ESMF study.....	198
<b>Chapter – 15</b>	<b>.....</b>	<b>209</b>
<b>Development strategy and private sector participation</b>	<b>.....</b>	<b>209</b>
15.1.	Development approach.....	209
15.2.	Strategic partners/developers.....	214
	<i>15.2.1. TKZC development option and strategy.....</i>	<i>214</i>
15.3.	Strategic linkages .....	215
15.4.	Procurement, bidding document and negotiation procedures.....	216
15.5.	Need for partnership with other countries.....	216
15.6.	Need for a host of partnering countries .....	217
15.7.	Likely partnering countries .....	218
15.8.	MoUs with potential partners and countries .....	218
15.9.	Opportunities for private sector participation in developing tourism components, infrastructure and research infrastructure.....	219
15.10.	Standards, quality control recommendations.....	219
15.11.	Sustainable Business Model Canvas for SE-TP –PIU, SE-TP -SPV .....	221

<b>Chapter - 16 .....</b>	<b>223</b>
<b>Governance, management structure and policy framework .....</b>	<b>223</b>
16.1. Governance & management structure of SE-TP including IRC-CoE&IDC .....	223
16.2. Institutional arrangements, roles and responsibilities of various agencies involved in SE-TP .....	228
16.3. Institutional arrangements, roles and responsibilities of various agencies involved in TKZC .....	229
16.4. Activities of the SE-TP:PIU, SE-TP:SPV .....	231
16.5. Activities of the TKZC:SPV .....	232
16.6. Formation of various SPVs .....	233
16.7. Strategies and policies for SE-TP .....	234
16.7.1. Need.....	234
16.7.2. Core policy initiatives for the SE-TP.....	234
16.7.3. Supporting policy initiatives.....	244
<b>Chapter - 17 .....</b>	<b>247</b>
<b>Project cost .....</b>	<b>247</b>
17.1. Approach for project cost estimation .....	247
17.2. Details of cost estimates.....	251
17.2.1. SE-TP common infrastructure.....	251
17.2.2. SE-TP connectivity and external infrastructure .....	252
17.2.3. TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries.....	253
17.3. Summary of SE-TP total investment.....	254
<b>Chapter - 18 .....</b>	<b>256</b>
<b>SE-TP including IRC-CoE&amp;IDC branding and marketing strategies.....</b>	<b>256</b>
18.1. Strategies.....	256
18.2. Micro-level sub-sector wise project opportunities and project profiles .....	258
18.3. Major marketing programs.....	259
18.4. International roadshows .....	259
18.5. Global Tourism & Knowledge-based Economy Summit (GTKES) .....	259
18.6. Strategies for popularising SE-TP.....	260
<b>Chapter - 19 .....</b>	<b>262</b>
<b>Implementation schedule and micro level action plan .....</b>	<b>262</b>
19.1. Implementation and monitoring mechanism.....	262
19.2. Phasing .....	268

19.3. Implementation schedule .....	271
<b>Chapter - 20 .....</b>	<b>275</b>
<b>Risk mapping, analysis and mitigation strategies .....</b>	<b>275</b>
20.1. The generalised approach towards risk management.....	275
20.2. Critical success factors for SE-TP.....	276
20.3. Need for multi-criteria analysis for risk assessment and risk assessment methodology .....	277
20.4. Combined risk assessment score.....	278
20.5. Five force analysis.....	279
<b>Chapter - 21 .....</b>	<b>282</b>
<b>Benefits and contribution.....</b>	<b>282</b>
21.1. SE-TP's overall objective.....	282
21.2. Analysis of benefits and contribution .....	282
21.3. Benefits to sustainable eco-tourism and knowledge-based green economy contributors .....	283
21.4. Benefits to sector .....	283
21.5. Quantitative benefits.....	286
21.6. Alignment with vision 2041 and Delta plan of GoB .....	286
21.7. Alignment with UN SDGs .....	287



# List of tables

## Chapter 1 - Introduction

Table No. 1.1: Stakeholder consultation meetings .....	16
--	----

## Chapter 3 - Tourism profile of Bangladesh, Cox's Bazar and its surrounding

Table No. 3.1: Sub-District baseline information .....	45
Table No. 3.2: Population details of Cox's Bazar District & Maheshkhali Upazila - 2001 & 2011 .....	45
Table No. 3.3: Tourist spots in Cox's Bazar District .....	47

## Chapter 6 - Tourist survey and projection

Table No. 6.1: Projected population of Sonadia Island.....	72
Table No. 6.2: Projected annual domestic tourists' arrival to SE-TP .....	72
Table No. 6.3: Summary of projected domestic tourists' footfall to SE-TP for the year 2050 .....	73
Table No. 6.4: Projected annual international tourists' arrival to SE-TP .....	73
Table No. 6.5: Summary of projected international tourists' footfall per annum to Sonadia Island.....	74
Table No. 6.6: Summary of total tourists' footfall to SE-TP .....	75

## Chapter 7 - Benchmarking - domestic and international comparable

Table No. 7.1: Key inferences from benchmarking exercise .....	80
Table No. 7.2: Proposed product mix for the project.....	82

## Chapter 8 - Site analysis

Table No. 8.1: Site parameters .....	83
--------------------------------------	----

## Chapter 9 - Transportation plan

Table No. 9.1: Distance to adjacent tourist spots .....	96
Table No. 9.2: Proposed tour packages .....	99
Table No. 9.3: Estimation of battery car requirement .....	101
Table No. 9.4: Speed boats to reach SE-TP .....	102
Table No. 9.5: Type of road within Sonadia Island.....	102
Table No. 9.6: Modal share and total users for internal movement within SE-TP .....	103
Table No. 9.7: Modal share and batch-wise users for internal movement within SE-TP .....	103
Table No. 9.8: Passenger capacity of boats for boat ride route .....	104
Table No. 9.9: Battery car within SE-TP .....	104
Table No. 9.10: Proposed unit transport cost within Sonadia Island.....	104

## Chapter 10 - Master plan of SE-TP

Table No. 10.1: Multi-criteria considerations for shortlisting themes and attractions .....	115
Table No. 10.2: Space allocation for different components.....	115
Table No. 10.3: Statement of the zoning plan .....	117
Table No. 10.4: TAF and other facilities of the entrance zone.....	119
Table No. 10.5: TAF and other facilities of heritage and hospitality zone .....	120
Table No. 10.6: Facilities of the knowledge centre zone.....	122
Table No. 10.7: TAF and other facilities of family entertainment zone.....	123
Table No. 10.8: TAF and other facilities of the adventure zone.....	124
Table No. 10.9: TAF and other facilities of eco-science zone .....	124

## Chapter 11 - Master plan of IRC-CoE&IDC

Table No. 11.1: Broad design considerations for IRC-CoE&IDC .....	130
Table No. 11.2: Typical services in Bangladesh engineering consulting sector (not exhaustive) .....	144
Table No. 11.3: Details of IRC – CoE for life sciences .....	146
Table No. 11.4: Details of IRC –CoE for alternative and renewable energy .....	147
Table No. 11.5: Details of IRC – CoE for environmental technologies and sustainable business practices.....	148
Table No. 11.6: Details of IRC– CoE for innovative materials and innovative products.....	149
Table No. 11.7: Details of IRC – CoE for built environment and sustainable communities .....	149
Table No. 11.8: Details of IRC – IDC .....	150

## Chapter 12 - Infrastructure plan within SE-TP including IRC-CoE&IDC

Table No. 12.1: Details of components covered under the infrastructure plan .....	156
Table No. 12.2: Water demand estimation norms and assumptions .....	158
Table No. 12.3: Water consumption pattern .....	158
Table No. 12.4: Wastewater generation pattern .....	161
Table No. 12.5: Sewage and sullage generation pattern .....	161
Table No. 12.6: Sewage quality .....	162
Table No. 12.7: STP process and units .....	162
Table No. 12.8: Details of NMT corridors within the SE-TP.....	170
Table No. 12.9: Estimated water demand – zone wise.....	172
Table No. 12.10: Estimation of average daily water demand.....	172
Table No. 12.11: Water demand for one-time water requirement.....	173
Table No. 12.12: Underground sump storage capacity .....	174
Table No. 12.13: Overhead tank storage capacity.....	174
Table No. 12.14: Pump capacity.....	174
Table No. 12.15: Estimation of sewage and sullage generation.....	175
Table No. 12.16: Estimation of solid waste generation .....	176
Table No. 12.17: Estimation of power demand .....	178
Table No. 12.18: Estimation of solar power generation.....	182
Table No. 12.19: Specialised research facilities .....	182

## Chapter 14 - Environmental and social assessment

Table No. 14.1: List of international, national policy, legal and institutional framework.....	194
--	-----

Table No. 14.2: Overview of environmental legal, regulatory and policy requirements .....	195
Table No. 14.3: Considerations for ESMF study and ESMP .....	198
Table No. 14.4: Tourism-related facilities, research facilities and infrastructure-related activities.....	202
Table No. 14.5: Mitigation measure.....	204
Table No. 14.6: Suggested measures.....	204

## Chapter 15 - Development strategy and private sector participation

Table No. 15.1: Summary of implementation, investment and viability analysis approach adopted for each development zone of SE-TP – SE-TP common infrastructure including specialised tourism infrastructure but outside the periphery of earmarked TKZC .....	210
Table No. 15.2: Summary of implementation, investment and viability analysis approach adopted for SE-TP connectivity and external infrastructure .....	211
Table No. 15.3: Summary of implementation, investment and viability analysis approach adopted for each development zone identified within SE-TP –TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries– full zones or separate TKZC .....	212
Table No. 15.4: Model MoUs.....	218
Table No. 15.5: Global ISO standards .....	220
Table No. 15.6: Blocks of sustainable business model canvas.....	222

## Chapter 16 - Governance, management structure and policy framework

Table No. 16.1: Legal framework for SE-TP:PIU and SE-TP:SPV .....	224
Table No. 16.2: Legal framework for SE-TP:PIU, SE-TP:SPV and TKZC:SPV .....	225
Table No. 16.3: Activities of SE-TP:PIU and SE-TP:SPV .....	231
Table No. 16.4: Activities of TKZC:SPV .....	232
Table No. 16.5: Strategies and policies for SE-TP – Tourism governance and structure.....	235
Table No. 16.6: Strategies and policies for SE-TP – Economic performance, investment and competitiveness .....	238
Table No. 16.7: Strategies and policies for SE-TP – Employment, decent work and human capacity .....	240
Table No. 16.8: Strategies and policies for SE-TP – Poverty reduction and social inclusion .....	241
Table No. 16.9: Strategies and policies for SE-TP – Sustainability of the natural and cultural environment .....	243
Table No. 16.10: Strategies and support policies for SE-TP – Housing sector .....	244
Table No. 16.11: Strategies and support policies for SE-TP – the Transportation sector .....	245
Table No. 16.12: Strategies and support policies for SE-TP – Solid waste management.....	245

## Chapter 17 - Project cost

Table No. 17.1: Development elements cost detail .....	247
Table No. 17.2: Cost of SE-TP common infrastructure.....	251
Table No. 17.3: Cost of SE-TP connectivity and external infrastructure .....	252
Table No. 17.4: TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries - Project cost estimate (Taka in million) .....	253
Table No. 17.5: Summary of SE-TP total investment and mode of development.....	255

## Chapter 18 - SE-TP including IRC-CoE&IDC branding and marketing strategies

Table No. 18.1: Strategies and action plan.....	256
Table No. 18.2: Target group and core theme.....	257
Table No. 18.3: Preparation of micro-level sub-sector wise project opportunities.....	258
Table No. 18.4: Strategies for popularising SE-TP .....	260

## Chapter 19 - Implementation schedule and micro level action plan

Table No. 19.1: Priority projects of SE-TP .....	268
--	-----

## Chapter 20 - Risk mapping, analysis and mitigation strategies

Table No. 20.1: Risk matrix.....	277
Table No. 20.2: Composite risk assessment score during implementation stage .....	277
Table No. 20.3: Composite risk assessment score during operation stage.....	278
Table No. 20.4: Composite risk assessment score.....	278
Table No. 20.5: Composite competitiveness assessment score based on five forces analysis – SE-TP .....	281

## Chapter 21 - Benefits and contribution

Table No. 21.1: SE-TP including IRC-CoE&IDC - benefits to sustainable eco-tourism and knowledge-based green economy contributors .....	283
Table No. 21.2: SE-TP including IRC-CoE&IDC – sector benefits and contribution .....	284
Table No. 21.3: SE-TP including IRC-CoE&IDC congruence with UN SDGs .....	287

# List of exhibits

## Chapter 1 - Introduction

Exhibit No. 1.1: Structure of the comprehensive MP&DP.....	20
--	----

## Chapter 2 - Detailed activities and approach methodology

Exhibit No. 2.1: Objectives of the assignment.....	32
Exhibit No. 2.2: Broad objectives of SE-TP.....	33
Exhibit No. 2.3: IRC-CoE&IDC objectives.....	34
Exhibit No. 2.4: Study coverage.....	34
Exhibit No. 2.5: Systematic approach and studies.....	36

## Chapter 3 - Tourism profile of Bangladesh, Cox's Bazar and its surrounding

Exhibit No. 3.1: Regional setting details of Sonadia Island.....	43
Exhibit No. 3.2: Regional setting map of the proposed study area.....	43
Exhibit No. 3.3: Location of the proposed study area in Maheshkhali Upazila.....	44
Exhibit No. 3.4: Sex ratio of Cox's Bazar District.....	46

## Chapter 4 - Conceptualisation and configuration of SE-TP including IRC-CoE&IDC

Exhibit No. 4.1: Constraints in the tourism sector.....	49
Exhibit No. 4.2: Principles of Eco-Tourism.....	52
Exhibit No. 4.3: Main driving pillars of SE-TP.....	53
Exhibit No. 4.4: Holistic approach for sustainable tourism.....	54
Exhibit No. 4.5: State-of-the-art smart, sustainable SE-TP.....	55
Exhibit No. 4.6: Key principles of SE-TP with an underlay of private sector involvement.....	56
Exhibit No. 4.7: Objectives of development of IRC-CoE&IDC.....	57
Exhibit No. 4.8: Strategies for the sustenance of the Eco-Tourism cluster, innovation and R&D hub....	58
Exhibit No. 4.9: SE-TP including IRC-CoE&IDC objective enablers.....	59
Exhibit No. 4.10: Product differentiators.....	60
Exhibit No. 4.11: Innovative approach of SE-TP development in contrast to the traditional model.....	61

## Chapter 5 - Vision and mission of SE-TP including IRC-CoE&IDC

Exhibit No. 5.1: Inclusive, sustainable eco-tourism and knowledge-based green economy development.....	63
Exhibit No. 5.2: Sustainable tourism development and knowledge-based green economy development - end-to-end approach.....	64
Exhibit No. 5.3: Focus area, facilitators, enablers, linkages of the SE-TP including IRC-CoE&IDC.....	65
Exhibit No. 5.4: Key considerations – vision and mission.....	66
Exhibit No. 5.5: Specific topics considered - vision and mission.....	67
Exhibit No. 5.6: Goals, overall & specific objectives.....	68

## Chapter 6 - Tourist survey and projection

Exhibit No. 6.1: Diverse nature of tourist and vast expectations result in multi-formatted infotainment .....	71
Exhibit No. 6.2: Projected domestic tourists arrival per annum to SE-TP (in millions).....	73
Exhibit No. 6.3: Projected international tourists arrival per annum to SE-TP (in millions).....	74
Exhibit No. 6.4: Total expected tourists' footfall to SE-TP (in millions).....	75

## Chapter 7 - Benchmarking - domestic and international comparable

Exhibit No. 7.1: International comparable: distinct ecosystems.....	77
Exhibit No. 7.2: International comparable – tourist attraction facilities .....	78
Exhibit No. 7.3: International comparable: location of the tourism-based EZs .....	79

## Chapter 8 - Site analysis

Exhibit No. 8.1: Existing water channels.....	84
Exhibit No. 8.2: Natural features map .....	85
Exhibit No. 8.3: Existing connectivity to the proposed SE-TP .....	87
Exhibit No. 8.4: Proposed railway network of Chittagong division .....	88
Exhibit No. 8.5: Location of the airport and its' connectivity .....	89
Exhibit No. 8.6: Location of human settlements .....	90
Exhibit No. 8.7: Tourism spots/potentials in the vicinity of the proposed study area.....	90
Exhibit No. 8.8: Tidal chart recorded near Sonadia Island.....	91
Exhibit No. 8.9: Land use pattern of Sonadia Island.....	91
Exhibit No. 8.10: Existing land use map of Sonadia Island .....	92
Exhibit No. 8.11: Considerations for delineating the effective planning area .....	92
Exhibit No. 8.12: The delineated effective planning area for SE-TP .....	93

## Chapter 9 - Transportation plan

Exhibit No. 9.1: Proposed rail cum road alignment over the proposed bridge.....	95
Exhibit No. 9.2: Proposed connectivity between Maheshkhali Island and highway (N1) .....	98
Exhibit No. 9.3: Influential zone and tourists spots in the region.....	99

## Chapter 10 - Master plan of SE-TP

Exhibit No. 10.1: SE-TP master planning principles .....	106
Exhibit No. 10.2: Planning concept of SE-TP .....	108
Exhibit No. 10.3: Zonal planning considerations.....	110
Exhibit No. 10.4: Proposed transportation connectivity and linkages to SE-TP .....	111
Exhibit No. 10.5: Natural features inventory of SE-TP.....	111
Exhibit No. 10.6: Proposed trunk road cum embankment based on the buffer zone .....	112
Exhibit No. 10.7: Conceptual planning of embankment/road.....	113
Exhibit No. 10.8: Multi-criteria considerations for shortlisting themes and attractions.....	114
Exhibit No. 10.9: Zoning plan of SE-TP .....	117
Exhibit No. 10.10: Land use pattern of proposed zones .....	118
Exhibit No. 10.11: Summary of infotainment zones, TAF and other facilities .....	118
Exhibit No. 10.12: Aerial view of the entrance zone .....	120
Exhibit No. 10.13: Aerial view of heritage and hospitality zone.....	121
Exhibit No. 10.14: Aerial view of the knowledge centre zone.....	122
Exhibit No. 10.15: Aerial view of family entertainment zone.....	123

Exhibit No. 10.16: Aerial view of the eco-science zone .....	125
Exhibit No. 10.17: Location of public amenity and utility area .....	127

### **Chapter 11 - Master plan of IRC-CoE&IDC**

Exhibit No. 11.1: IRC-CoE&IDC planning concepts .....	129
Exhibit No. 11.2: Bio-technology market segments .....	132
Exhibit No. 11.3: Life science thrust segments in the context of IRC-CoE .....	133
Exhibit No. 11.4: Alternative and renewable energy thrust segments in the context of IRC-CoE.....	135
Exhibit No. 11.5: IT-ITES and ICT thrust segments in the context of IRC-CoE.....	139
Exhibit No. 11.6: A selective list of drivers and issues in the changing institutional framework from the environmental perspective.....	139
Exhibit No. 11.7: Environment sector thrust segments in the context of IRC-CoE.....	141
Exhibit No. 11.8: Bangladesh consulting market segments.....	142
Exhibit No. 11.9: Thrust segments of consulting and consulting support services in the context of IRC-IDC.....	145

### **Chapter 12 - Infrastructure plan within SE-TP including IRC-CoE&IDC**

Exhibit No. 12.1: SE-TP including IRC-CoE&IDC infrastructure objectives.....	154
Exhibit No. 12.2: STP process flow diagram (SBR technology) .....	163
Exhibit No. 12.3: Waste reduction by integrated SWM .....	165

### **Chapter 13 – SE-TP offsite infrastructure and linkages**

Exhibit No. 13.1: Approach road connecting the planning area.....	187
Exhibit No. 13.2: External power supply line to the proposed SE-TP including IRC-CoE&IDC .....	189
Exhibit No. 13.3: External potable water supply line to the SE-TP .....	190

### **Chapter 15 - Development strategy and private sector participation**

Exhibit No. 15.1: TKZC development options.....	215
Exhibit No. 15.2: Cooperation strategies leveraging synergy.....	217

### **Chapter 16 - Governance, management structure and policy framework**

Exhibit No. 16.1: Contractual structure of SE-TP:PIU and SE-TP:SPV .....	223
Exhibit No. 16.2: Contractual structure of TKZC:SPV .....	224
Exhibit No. 16.3: Suggested development structure of SE-TP .....	229
Exhibit No. 16.4: Activities and responsibilities between SE-TP:PIU, SE-TP:SPV and TKZC:SPV.....	230
Exhibit No. 16.5: TKZC roles and linkages.....	230
Exhibit No. 16.6: Various SPV options.....	233

### **Chapter 17 - Project cost**

Exhibit No. 17.1: Computation of project cost.....	251
Exhibit No. 17.2: Cost of SE-TP common infrastructure – Phase I (Taka in million) .....	252
Exhibit No. 17.3: Cost of SE-TP connectivity and external infrastructure (Taka in million).....	253
Exhibit No. 17.4: TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries – Phase I development (Taka in million).....	254



Exhibit No. 17.5: TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries - Phase-wise project cost.....254

**Chapter 18 - SE-TP including IRC-CoE&IDC branding and marketing strategies**

Exhibit No. 18.1: GTKES – Confluence of interested players .....260

**Chapter 19 - Implementation schedule and micro level action plan**

Exhibit No. 19.1: Action plan for SE-TP including IRC-CoE&IDC.....263

Exhibit No. 19.2: Organisation chart for SE-TP:PIU.....265

Exhibit No. 19.3: Organisation chart for SE-TP:SPV .....266

Exhibit No. 19.4: Organisation chart for TKZC:SPV .....267

Exhibit No. 19.5: Micro-level action plan.....271

**Chapter 20 - Risk mapping, analysis and mitigation strategies**

Exhibit No. 20.1: Risk and mitigation strategies .....275

Exhibit No. 20.2: SE-TP - critical success factors.....276

Exhibit No. 20.3: SE-TP risk assessment matrix during implementation in a 1 to 5 band.....278

Exhibit No. 20.4: Five forces analysis – SE-TP:PIU, SE-TP:SPV and TKZC:SPV .....280

Exhibit No. 20.5: SE-TP:PIU, SE-TP:SPV and TKZC:SPV competitiveness assessment matrix based on five forces analysis score.....281

**Chapter 21 - Benefits and contribution**

Exhibit No. 21.1: SE-TP including IRC-CoE&IDC congruence with vision 2041 and Delta plan .....286



## List of abbreviations

AV	Audio-Video
B <sub>2</sub> B	Business to Business
BBS	Bangladesh Bureau of Statistics
BEZA	Bangladesh Economic Zone Authority
BUA	Built-up area
BWDB	Bangladesh Water Development Board
CCTV	Closed-circuit television
CDM	Clean Development Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO <sub>2</sub>	Carbon Dioxide
CoxDA	Cox's Bazar Development Authority
CSP	Concentrating solar power
Cum/hr	Cubic Metre per Hour
DevCon	Dev Consultants Limited
DG	Diesel Generator
DI	Ductile Iron
DNA	Deoxyribo Nucleic Acid
DoE	Department of Environment
DoF	Department of Forestry
DPHE	Department of Public Health Engineering
DSS	Decision Support System
E&S	Environmental and Social
EA	Environmental Assessment
EAN	Enriched Air Nitrox
ECA	Ecologically Critical Area
EDWHC	Employment, Decent Work and Human Capacity
EIA	Environmental Impact Assessment
EIP	Eco-Industrial Park
ELISA	Enzyme-Linked Immunosorbent Assay
ELSR	Elevated Level Storage Reservoir
EMP	Environmental Management Plan
EPC	Engineering, Procurement and Construction
EPIC	Economic Performance, Investment and Competitiveness
ESIA	Environment and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ETA	Environmental Technical Assistance
EZs	Economic Zones
FDI	Foreign Direct Investment

ft.	feet
FTIR	Fourier-Transform Infrared
GDP	Gross Domestic Product
GIS	Geographical Information System
GLSR	Ground Level Storage Reservoir
gm	gram
GoB	Government of Bangladesh
GoT	Government of Tourism
GSTC	Global Sustainable Tourism Council
GTKES	Global Tourism & Knowledge-based Economy Summit
HDPE	High-Density Polyethylene
hr.	hour
HVAC	Heating, Ventilation, and Air Conditioning
ICT	Information and Communications Technology
IoL	Inventory of Losses
IRC-CoE&IDC	Innovation Research Centre-Centres of Excellence & International Design Centre
IRD	Influence Region Development
ISO	International Standard Organisation
ISPS	Integrated Safeguard Policy Statement
IT	Information Technology
JICA	Japan International Co-operation Agency
kg	Kilogram
Km	Kilometre
KPIs	Key Performance Indicators
kV	kilo-Volt
kVA	kilo Volts Ampere
kW	Kilowatt
LED	Light Emitting Diode
LEED	Leadership in Effective Energy Design
LPCD	Litres Per Capita per Day
m	metre
M&E	Monitoring & Evaluation
m/s	metre per second
MACE	Mahindra Consulting Engineers Limited
MEP	Mechanical Electrical Plumbing
MFIs	Micro Finance Institutions
MFL	Maximum Flood Level
mg /l	milligram per litre
MICE	Meetings, Incentives, Conferences and Exhibitions
MLD	Millions of Litres Per Day
mm	millimetre
MoUs	Memorandum of Understandings
MP&DP	Master Plan & Development Plan
MSL	Mean Sea Level
mVA	mega-Volt Ampere
MW	Megawatt

NGOs	Non-Governmental Organisations
NMT	Non-Motorised Transport
O&M	Operation and Maintenance
°C	Degree Celsius
OHT	Overhead Tank
OSs	Operational Safeguards
PAPs	Project Affected Persons
PCU	Passenger Car Unit
PESTEL	Political, Economic, Social, Technological, Environmental and Legal
PIU	Project Implementation Unit
PPP	Public-Private Partnership
PV	Photovoltaic
R&D	Research & Development
REB	Rural Electrification Board
RHD	Roads and Highways Department
SBMC	Sustainable Business Model Canvas
SBR	Sequencing Batch Reactor
SCP	Sustainable consumption and production
SE-TP	Sonadia Eco-Tourism Park
SEZ	Special Economic Zone
SMEs	Small and Medium Enterprises
SMP	Social Management Plan
SPVs	Special Purpose Vehicles
sq.km	Square kilometre
STP	Sewage Treatment Plant
SWM	Solid waste management
SWOT	Strength, Weakness, Opportunities and Threat
TAF	Tourist Attraction Facilities
TGS	Tourism Governance and Structure
TKZC	Tourism and Knowledge Zone Component
TOAC	Tour Operators Association of Cox's Bazar
TPD	Tonnes Per Day
TS	Transportation Sector
UN	United Nations
UN SDGs	United Nations Sustainable Development Goals
UNIDO	United Nations Industrial Development Organisation
UNWTO	United Nations World Tourism Organisation
USPs	Unique Selling Propositions
UV - VIS	Ultraviolet-Visible spectrophotometry
W	Watt
WB	World Bank
WHO	World Health Organisation
WTP	Water Treatment Plant
WTTC	World Travel and Tourism Council

# Executive summary

## Project background

Tourism sector has witnessed an innovative mould presenting a new perception with development of qualitative trends which include the development of the concept of sustainable tourism, increased market segmentation, development of new forms of tourism, especially those related to nature, ocean wealth, wildlife, rural areas, culture, arts & crafts, heritage, sustainable tourism, eliminating poverty etc. Bangladesh has a vast geographical spread and great historical and cultural heritage, which are excellent conditions for growth in the tourism sector. The Government of Bangladesh (GoB) have placed tourism on a priority platform, making efforts to sustainably explore and utilise the tourism resources and potential offered by the country. The development of the tourism sector and the overall development of tourism destination is Bangladesh's key priority and a strategic objective for the diversification of the Bangladesh economy. The GoB's objective is to maximise the potential direct and indirect impacts through a more modern regime of Economic Zones (EZs) including Tourism SEZ.

The GoB, in its endeavour to promote sustainable tourism, intends to develop the Sonadia Island, as an international eco-tourism destination. The proposed Sonadia Eco-Tourism Park (SE-TP) lies in the

Sonadia Island of Cox's Bazar District in Chittagong Division of Bangladesh. One of the biggest Tourism SEZ to be supported by Bangladesh Economic Zones Authority (BEZA) is the SE-TP project which is 3 km North of Cox's bazar under Maheshkhali Upazila, which will be a large-scale tourism development containing both public and private investment. Blessed with several natural features like mangrove forest, the sight of birds, endangered species, red crabs, turtles, SE-TP, can offer immense potential to emerge as a leading tourist destination in the world. Also, it is proposed to establish an integrated innovation and research hub to support the growth of innovative companies across sectors such as life sciences, green technologies and other such green industries and services leveraging the sustainable eco-tourism initiative.

The BEZA engaged a consortium of Mahindra Consulting Engineers Limited (MACE), belonging to US\$ 21 billion Mahindra Group, India and Dev Consultants Limited (DevCon), Bangladesh, as consultants for the SE-TP through a transparent bidding process, to prepare a comprehensive 30-year Master Plan and Development Plan (MP&DP) with supporting infrastructure/utility planning for the SE-TP.

## Site visit and stakeholder consultation meetings

The discussion with the stakeholders improved better understanding of the ground situation, facilitated collection of various information/data, deeper understanding of the influencing factors both on-site and off-site, existing developments around the

District, and stakeholder's needs and expectations from the proposed SE-TP. Based on the input and feedback from the consultation, the MP&DP has been prepared. The details of stakeholder consultation and relevant considerations are incorporated in the study.

## Conceptualisation and configuration of SE-TP including IRC-CoE&IDC

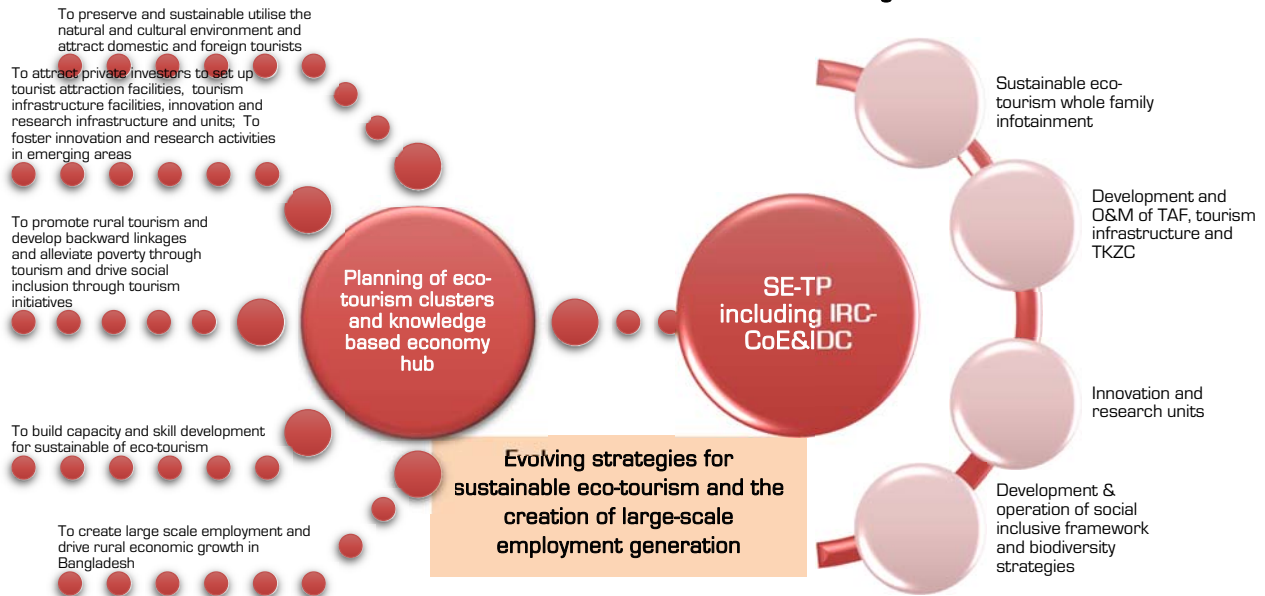
This project is first of its kind in Bangladesh conceptualised for the sustainable and holistic development of eco-tourism cluster and knowledge-based green economy. A holistic approach is adopted in terms of seamless integration of leisure, entertainment, education, research, capacity building and skill development. In this context, a state-of-the-art innovation and research centre (IRC) to promote knowledge-based green economy is also planned within SE-TP. The IRC shall have multiple centres of excellence

(CoE) for housing domestic and international companies engaged in innovative, sustainable and clean technologies, and research activities & sustainable solution providers. Apart, IRC shall house international design centre (IDC) to facilitate design, engineering, technical, consulting, advisory & research services. Thus IRC-CoE&IDC shall serve as a catalyst to foster innovation and to emerge as a regional centre of innovation and knowledge creation.

The sustainability in tourism involves holistic and interdisciplinary approach encompassing sustainable management of resources, enhanced business sustenance, ensuring sustained interest of tourist, continued up-gradation of facilities, socioeconomic impacts, cultural impacts, environmental impacts (including responsible consumption of resources, reducing pollution, and conserving biodiversity and landscapes) and compliance to the relevant UN-SDGs. A well-conceived tourist-centric concepts and knowledge workers

conducive business environment strategies are incorporated to position SE-TP as a world-class tourism and knowledge-based economy destination while conserving and protecting biodiversity, cultural values and national pride. The aim is to achieve safe, climate-resilient and prosperous SE-TP while promoting knowledge, innovation-based green economy through the establishment of IRC-CoE&IDC. The broad objectives of SE-TP are depicted in **Exhibit No. 1**.

**Exhibit No. 1: Sustainable eco-tourism cluster through SE-TP**

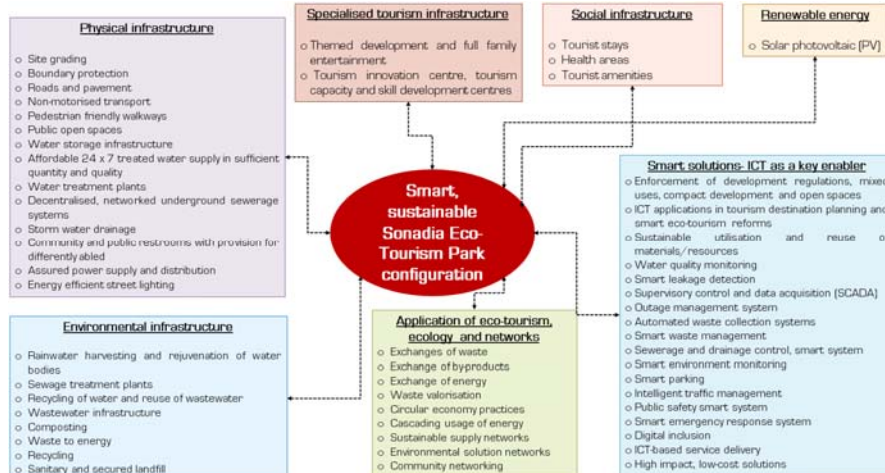


\***Innovation research centre (IRC) – Centre of Excellence (CoE) & International Design Centre (IDC)**  
 Source: MACE analysis

The state-of-the-art smart, sustainable SE-TP shall be established in terms of both hard infrastructure and human dimension interventions as depicted in **Exhibit No. 2**. Apart from promoting

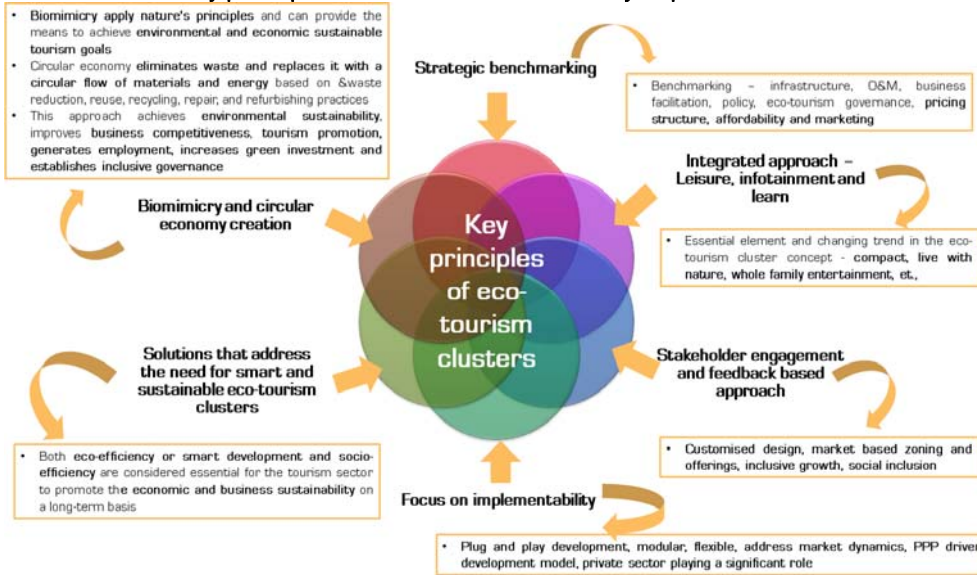
sustainable tourism, SE-TP shall have the privilege of touching the lives of people and the community by participating in socially inclusive initiatives. **Exhibit No. 3** shows the key principles of developing MP & DP.

**Exhibit No. 2: State-of-the-art smart, sustainable SE-TP**



Source: MACE analysis

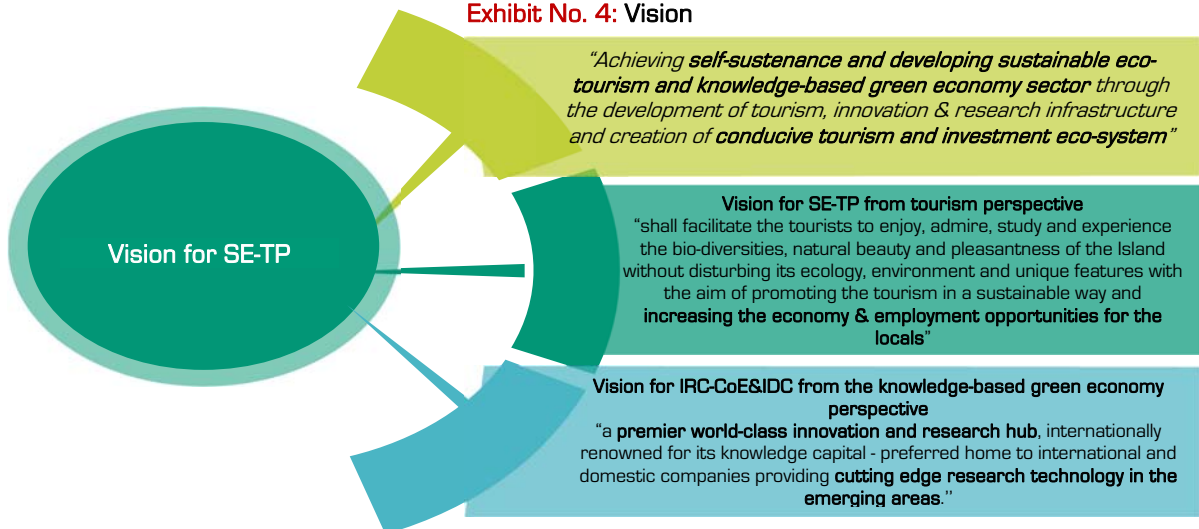
**Exhibit No. 3: Key principles of SE-TP with an underlay of private sector involvement**



Source: MACE analysis

Compared to the traditional approach, SE-TP development encompasses several unique elements as detailed in Exhibit No. 4.

**Exhibit No. 4: Vision**



Source: MACE analysis

**Tourist survey and projection**

The inflow streams to the proposed SE-TP are identified as people living in the influence zone, foreign tourist and domestic tourist visiting Cox's Bazar District. A detailed assessment of the influence zone, the inflow of visitors under various scenarios, is computed. The demand assessment has been done

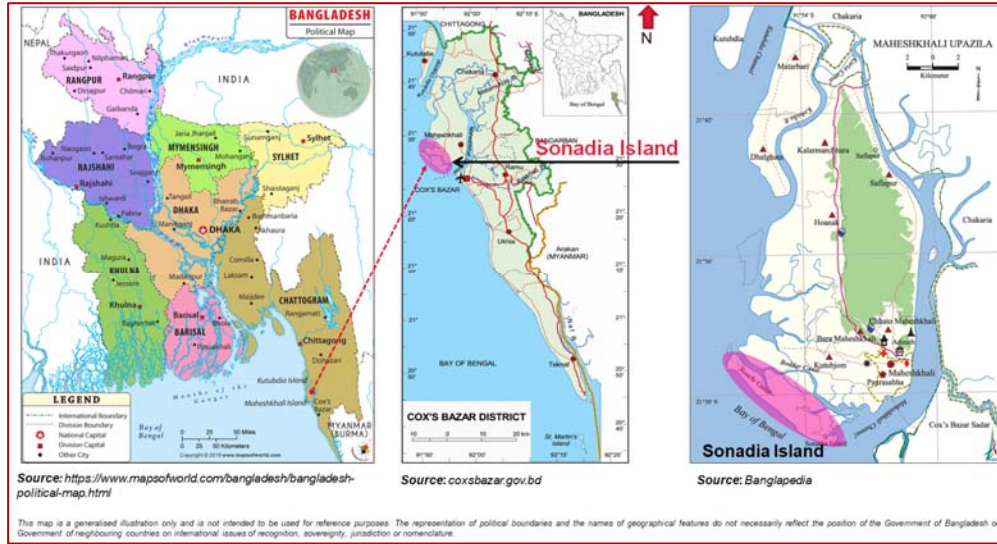
considering three different scenarios viz., base case scenario, conservative scenario and aggressive scenario and the summary of total tourists' footfall to SE-TP. Total expected annual tourists' footfall to SE-TP in 2050 varies from 2.56 million on a conservative basis and to 5.57 million on an aggressive basis.

## Site analysis

The regional setting map with administrative boundaries is depicted in **Exhibit No. 5**. SE-TP thrives on-site features and assets, such as the natural environment, a warm climate, rich cultural heritage and plentiful human resources, thus positioning SE-TP in comparative advantage. The study presents the

salient features of the identified location regarding its connectivity, bio-diversity, ecological features, sensitive features, infrastructure availability, constraints and opportunities with an emphasis on the mitigation measures to be adopted to overcome the constraints.

**Exhibit No. 5: Regional setting map of the proposed study area**



*Source: MACE analysis*

## Transportation plan

There is a requirement for the development of bridge over Maheshkhali channel connecting the mainland with the proposed railway line and highway N1 (connecting Chittagong with Cox's Bazar). The proposed railway line has not been directly linked to Sonadia Island, and it can be reached through approach road and Zila road of Maheshkhali Island. This has been proposed considering the possible environmental impact such as noise and vibration due to train movements which may affect the sensitive bio-diversities of Sonadia Island. From Maheshkhali Island, it is suggested that the tourists can use the battery-operated vehicle to reach Sonadia Island. There are 2 number of jetties proposed-one at Sonadia Island and one at Cox's Bazar to exclusively facilitate the tourist's movement to Sonadia Island through waterway from Cox's Bazar. An embankment cum spinal road of 7.5 m wide running for a length of 17.9 km has been proposed linking the proposed jetty at the Southern tip of Sonadia Island. This spinal road is proposed to be connected with the footpaths/internal driveway for

NMT vehicles. Provision for cycle tracks and pedestrian path have been proposed parallel to the main trunk road. In-depth analysis of transport infrastructure in terms of the status of road communication on Dhaka-Chittagong-Cox's Bazar-Teknaf Corridor, upgrading and construction of new transport infrastructure, road access to Sonadia Island from Chittagong- Cox's Bazar highway, road network within Cox's Bazar city to facilitate tourist movement are analysed.

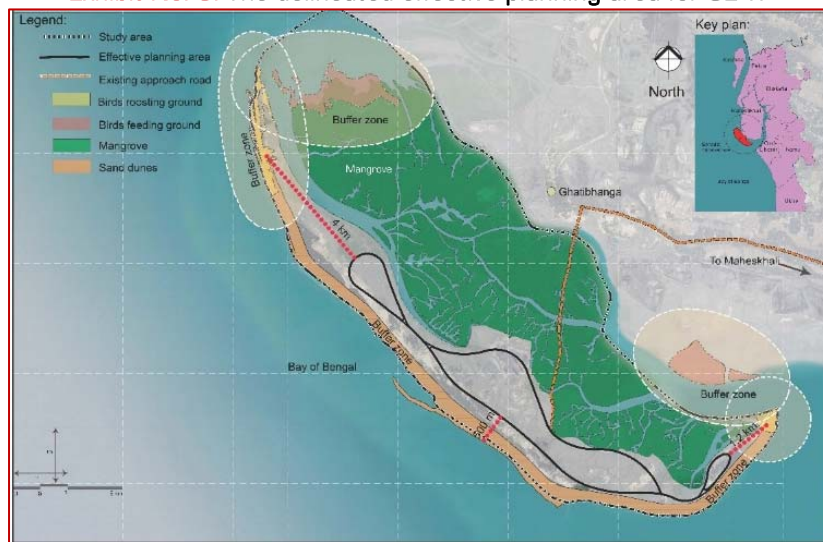
Detailed transportation plan in terms of connectivity, transport network, transport infrastructure, transport facilities, traffic management etc. are studied along with the interventions required. For the sustained business operation of SE-TP and for occupant units of IRC-CoE&IDC, it is pertinent that off-site infrastructure and SE-TP connectivity are adequately addressed, and these aspects are covered in the study.

Sustainable eco-tourism, through SE-TP initiative, is a vehicle to foster economic and social growth of Bangladesh, through the achievement of the development imperatives, while minimising negative social, cultural and environmental impacts. The SE-TP is a self-contained region with a salubrious surrounding and will eventually emerge as a “Sustainable-holistic-smart- intelligent-Eco-Tourism zone”. The study provides the structure of SE-TP master plan, objectives of the master plan and planning framework, planning considerations, zones spotting, land use pattern and space allocation, development plan, phased development etc. The existing eco-sensitive areas such as birds roosting and feeding ground, turtle’s

hatcheries & nesting area, red crabs crawling area along seashore, mangroves and water channels have been retained, and these areas are excluded from the overall development plan. Adequate buffer is provided from the shoreline along the coast for protecting turtles & red crabs and also for birds roosting and feeding ground.

From the overall study area of 8967 acres, effective planning area of 909.4 acres has been delineated based on outcomes from analysis of existing features, identified issues and constraints. **Exhibit No. 6** depicts delineated effective planning area.

**Exhibit No. 6: The delineated effective planning area for SE-TP**



*Source: MACE analysis*

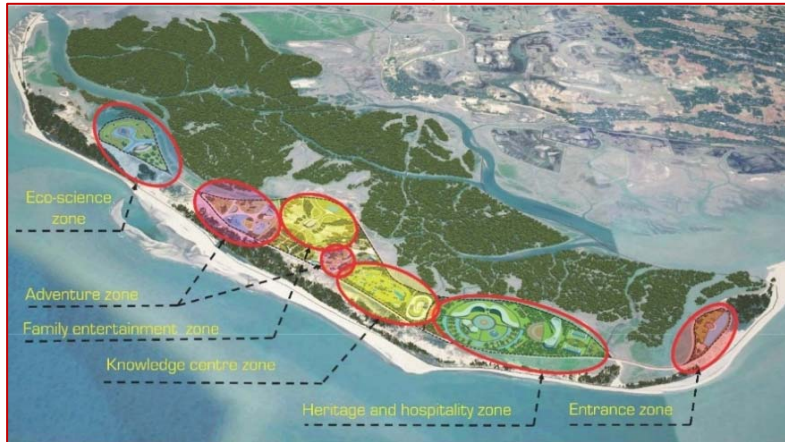
Based on the demand assessment, benchmarking analysis of international comparisons, primary survey etc. a detailed master plan is prepared to have an optimum mix of tourist attraction facilities (TAF) and other tourism-related facilities while ensuring the principles of sustainable eco-tourism. The planning of installations of allocated Tourism and Knowledge Zone Component (TKZC) shall be the responsibility of the respective private companies/occupant units. However, such planning shall adhere to overall regulations and stipulations laid by SE-TP development authority. A structured process is adopted for evaluating the themes and attractions based on adherence to a set of compliance criteria and

its responsiveness, as it is pertinent that the themes and attractions fulfil the tenets of sustainable eco-tourism and promotion of knowledge-based green economy. Sustainability and eco-restoration occupy the centre stage of the entire development and operation cycle.

The proposed zones include Entrance zone, Heritage & hospitality zone, Knowledge centre zone, Family entertainment zone, Adventure zone, and Eco-science zone. The proposed zones have been spatially distributed within the proposed SE-TP based on various considerations, as depicted in **Exhibit No. 7**.



**Exhibit No. 7: Zoning plan of SE-TP**



*Source: MACE analysis*

Various sustainable eco-tourism elements, sustainability initiatives, biomimicry and circular economy principles have also been incorporated into the planning process to position the development on a sustainable path.

**The master plan of IRC-CoE&IDC**

The IRC shall have multiple CoE focusing on research & innovation activities on emerging areas of national interest and shall provide an intellectually stimulating environment through which professionals from academia, industry, incubators and research laboratories can collaborate on projects of business, government, societal, commercial and national significance. Apart, IRC shall house international design centre (IDC) to facilitate design, engineering, technical, consulting, advisory & research services. The focus of the IRC-CoE is on innovation and technology-led businesses that enhance Bangladesh competitive advantage and align with the economic, industrialisation, and knowledge development strategy, particularly in areas such as life sciences, alternative & renewable energy, environment technologies & sustainable business practices, advanced materials &

innovative products, built environment & sustainable communities. IRC-IDC shall house cutting edge technology companies engaged in both product & project design, engineering & consulting as well as consulting support services. IRC-IDC, as global design and engineering hub of international standards, is poised to attract a wide range of knowledge worker organisations.

The focus areas, targeted sectors are analysed and presented in **Exhibit No. 8**. The master planning is envisioned so as IRC-CoE&IDC can achieve the status of a world-class entity within the first decade of its existence. Commensurate with this, IRC-CoE&IDC shall have state-of-the-art construction and inbuilt facilities, global IT connectivity and support structure.

**Exhibit No. 8: Thrust areas of IRC-CoEs & IDC**

**Life science - IRC-CoE**

- Agricultural biotechnology
- Health care and enzyme technology
- Aquaculture and marine biotechnology
- Computational biology
- Industrial biotechnology, bioprocess engineering
- Environmental technology, waste technology

**Alternative and renewable energy - IRC-CoE**

- Solar photovoltaic (PV), solar CSP
- Hydrogen energy, fuel cells
- Fuels from sunlight
- Electric and hybrid electric vehicles
- Geothermal energy and tidal energy
- Biomass utilisation, waste to energy technologies
- Batteries and energy storage

**Environment sector - IRC-CoE**

- Water, wastewater, waste management, clean environmental technologies
- Clean development mechanism
- Lifecycle assessment
- Environmental governance
- Environmental compliance and sustainability reporting

**IT-ITES and ICT - IRC-CoE**

- ERP and integrated business application
- Accounting and financial software, banking applications
- HR and payroll solution, CRM, marketing and sales automation, e-commerce and portals
- Mobile application, customised software development
- Hospital, education institute, office and insurance management system
- POS and inventory management system
- Security, biometric and alert systems
- Capital market and micro finance solutions
- Media and enterprise content management system

**Consulting and consulting support services - IRC-IDC**

- Business intelligence, technical analysis
- Legal, accounting, policies and procedures, and regulations
- Engineering/technical consulting
- Research and analytic

*Source: MACE analysis*

## Infrastructure facilities within SE-TP including IRC-CoE&IDC

Provision of infrastructure and facilities is crucial for the sustained development and operation of SE-TP and for the occupant units of IRC-CoE&IDC. The study dwells on SE-TP common infrastructure facilities:

- General infrastructure covering boundary wall and fencing; roads; non-motorised transport (NMT); bicycle movement; and pedestrian walkways; non-vehicle streets; smart parking; security and surveillance; robust IT connectivity and digitalisation; specific features for differently-abled;
- Social infrastructure covering training centre, incubation centre; commercial infrastructure zone; utility and support infrastructure zone; innovative use of open space and visible improvement;
- Environmental and green infrastructure covering water treatment; adequate water supply including wastewater recycling and stormwater reuse;

drainage; rainwater harvesting; sewerage network; sewage treatment and wastewater recycling infrastructure; sanitation including solid waste management (SWM); composting and environment/pollution abatement structures; assured electricity supply; renewable energy; waste to energy; site energy utilisation; energy-efficient street lighting; and

- Specialised tourism infrastructure.

IRC-CoE&IDC facilities shall be regularly maintained and continuously upgraded to be world-competitive. These infrastructure facilities are grouped under major heads like general infrastructure, multi-facility complex, entertainment and social facilities, health areas, parks and sports zone, transportation system, signage's, green infrastructure, specific and specialised infrastructure etc.

## SE-TP offsite infrastructure and linkages

For the sustained business operation of SE-TP and for occupant units of IRC-CoE&IDC, it is pertinent that off-site infrastructure and SE-TP connectivity are adequately addressed.

## Environmental and social assessment

In the SE-TP context, a suitable balance must be established between the three dimensions of sustainability to guarantee its long-term sustenance of SE-TP. The poverty reduction, social inclusion and creation of large-scale local employment aspect should include measures to prevent or minimise the potential negative social impacts of SE-TP. The study provides the environmental and social (E&S) assessment, the methodology of E&S review, an overview of environmental, legal, regulatory and policy requirements, baseline data, conservative measures, impact assessment, mitigation measures based on the studies and inferences drawn at feasibility level of investigation. Considering the sensitivity of the proposed site, it can be said that overall the impacts from pre-construction, construction and operation phase will have quite detrimental impacts to the

surrounding environment. Many of the impacts are possibly irremediable in nature and can't be replenished, and the proposed site is quite rich from an ecological point of view. Hence, a thorough Environment and Social Impact Assessment (ESIA) and Environment and Social Management Plan (ESMP) study needs to be conducted. The study also gives a brief of the requirements for conducting the ESIA and ESMP. The objective of the ESMP is to develop procedures and plans to ensure that the mitigation measures for identified impacts are implemented throughout the project phases. Also, ESMP needs to ensure the effective long-term protection of the area and other biotic and abiotic components of the environment. The study also provides the generalised guidelines for E&S safeguard activities for SE-TP development and operations.

## Development strategy and private sector participation

The development model of SE-TP nodes encompasses options like government interventions or in PPP mode or entirely by the private sector. The development of the SE-TP common infrastructure shall be under the control of the Project Implementation Unit (SE-TP:PIU) created within BEZA to manage the implementation of SE-TP. The PIU being formed under BEZA shall have representatives from GoB and the District level authorities. The O&M of the SE-TP common infrastructure shall be under the control of SE-TP:SPV. The SE-TP:SPV will be entirely a private sector entity. The execution of SE-TP connectivity and

external infrastructure shall be through the third party, and SE-TP:PIU shall actively involve in monitoring the progress of these activities and perform effective coordination for timely completion of these activities. The development and management of TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries shall be under the control of separate SPV (TKZC:SPV) and shall be monitored by government agencies like GoB and BEZA. The development approach and business model is presented in **Table No. 1**.

**Table No. 1: Development approach and business model**

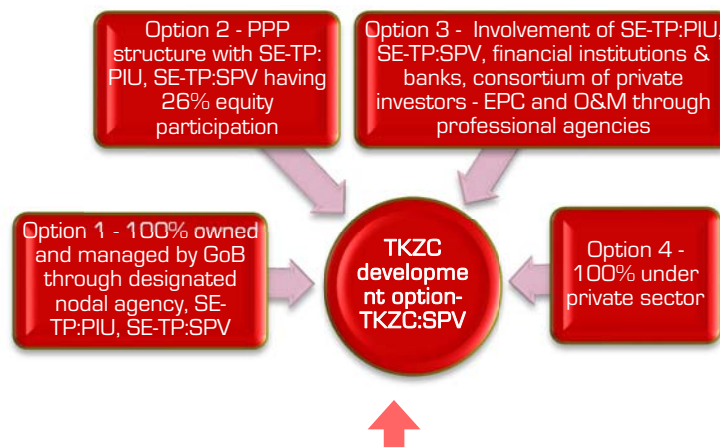
Component	Description
SE-TP common infrastructure including specialised tourism infrastructure, but outside the periphery of earmarked TKZC	<ul style="list-style-type: none"> <li>• Development - SE-TP:PIU</li> <li>• Capital expenses -BEZA</li> <li>• O&amp;M - SE-TP:SPV</li> <li>• <b>Self-sustenance operation model</b></li> </ul>
SE-TP connectivity and external infrastructure	<ul style="list-style-type: none"> <li>• Third-party government agencies</li> <li>• Capital expenses - GoB</li> <li>• O&amp;M through the third party</li> </ul>
TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries	<ul style="list-style-type: none"> <li>• TKZC:SPV development and O&amp;M</li> <li>• Capital expenses through:                             <ul style="list-style-type: none"> <li>▪ Contribution from SE-TP:PIU;</li> <li>▪ Equity by PPP concessionaire;</li> <li>▪ Term loan; and</li> <li>▪ Internal accrual</li> </ul> </li> <li>• <b>Self-sustenance capital recovery and operation model</b></li> </ul>

Source: MACE analysis

**Exhibit No. 9** depicts various development options for the development of the TKZC. The analysis includes scenarios on the extent of participation from GoB, through SE-TP:PIU and involvement from the

private sector, including roles and responsibilities in the development and operations of the proposed TKZC.

**Exhibit No. 9: TKZC development options**



GoB support to the TKZC – land on long term lease basis and other facilitation support offered through SE-TP:PIU, and SE-TP:SPV

Source: MACE analysis

## Governance, management structure and policy framework

SE-TP:SPV, TKZC:SPV shall be a body corporate established as per procedures of GoB. SE-TP:PIU, SE-TP:SPV and TKZC:SPV shall have several legal and contractual agreements towards concession, financing, marketing, availing external connectivity, marketing of TAF, marketing of space of IRC, and O&M. The institutional arrangements, roles and responsibilities of various agencies in developing and

managing SE-TP are discussed, including governance and management structure. The strategies and policies for SE-TP development and operation are elaborated in the context of tourism governance and structure, economic performance, investment and competitiveness, employment, decent work and human capacity, poverty reduction and social inclusion, the sustainability of the natural and cultural environment.

## Project cost

The total investment in SE-TP, excluding investment by occupant units of IRC-CoE&IDC, works out to **Taka 16948.61 million** and out of which **Taka 10230.04 million** (60%) will be from the private

sector through PPP mode or other variants. **Table No. 2** depicts a summary of SE-TP total investment and mode of development.

**Table No. 2: Summary of SE-TP total investment and mode of development**

Sl No.	Component	Mode of development (Taka in million)		
		SE-TP:PIU	Third-party - Government	TKZC:SPV
1	Sonadia Island tourism facilitation development	4440.52		
2	Entrance zone	163.17		
3	Heritage and hospitality zone	58.48		1963.81
4	Knowledge centre zone			862.77
5	Family entertainment zone	3.68		202.54
6	Adventure zone			353.82
7	Eco-science zone	103.71		6847.11
8	Amenity buildings	263.11		
9	Utility structures	1138.07		
10	Connectivity & external infrastructure		547.82	
	<b>Total</b>	<b>6170.74</b>	<b>547.82</b>	<b>10230.04</b>
		funding through GoB /BEZA and implemented through SE-TP:PIU	funded through GoB and implemented by third-party respective Government agencies	investment by PPP or private sector
	<b>Total project cost</b>			<b>16948.61</b>

*Source: MACE analysis*

## SE-TP including IRC-CoE&IDC branding and marketing strategies

A structured programme for the promotion of SE-TP to attract regular visits by domestic and foreign is vital. Further, structured promotion programme for SE-TP assumes significance to attract domestic and global players for ensuring sustained operations especially in the context of TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries and anchor tenant for IRC-CoE&IDC. Adopting well planned strategic branding, advertising campaign, and other sales promotion methods to promote this unique concept in identifying the

developer/co-developer for TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries and an anchor tenant for IRC-CoE&IDC assumes significance. It is pertinent to create an identity and develop a communication strategy to inform target groups, including co-developers about the SE-TP initiative. Good branding provides opportunities for greater collaboration and synergies and endows an external manifestation of strategic intent and creates differentiation in the market.

## Implementation schedule and micro-level action plan

The total period for implementation of the SE-TP connectivity and external infrastructure is estimated to be 24 months. The total period for implementation of the SE-TP common infrastructure and TAF, TKZC and full completion of SE-TP is estimated to be 120 months, considering the phased manner of development. However, the occupant units of IRC shall commence commercial production from

3<sup>rd</sup> year of development onwards. Further, the tourist visitors can avail the facilities of SE-TP from 3<sup>rd</sup> year onwards. Phase I development shall be carried out over an initial period of 2 years. The development of Phase II shall take place during 5<sup>th</sup> & 6<sup>th</sup> year, and Phase III development is contemplated on 9<sup>th</sup> year, and fully functional SE-TP including IRC-CoE&IDC shall commence from 10<sup>th</sup> year onwards.

## Risk mapping, analysis, and mitigation strategies

The combined risk assessment score is 1.87B, where 1A indicates low risk, whereas 5E indicates extreme risk on a combined assessment. The competitive assessment score in a 0-5 band (higher

the competitiveness for SE-TP, higher the score for SE-TP:PIU, SE-TP:SPV and TKZC:SPV) is 3.42 based on Porter's five forces modelling.

## Benefits and contribution

The establishment of SE-TP contributes to the growth of the sustainable eco-tourism and knowledge-based green economy sector in many aspects. The successful implementation of the SE-TP shall significantly improve the prospects of tourism and knowledge-based sectors in terms of enhanced revenues to the rural communities, tourism value chain actors, increased value-added opportunities, foreign exchange earnings, triggering local economy etc. It is expected that SE-TP, including IRC-CoE&IDC development, will trigger 3500 direct employment

across various levels and categories. The majority of these employment opportunities will be offered to the local communities after imparting the necessary skill through well-conceived skill development and capacity building programme. Apart, from direct employment, the proposed initiative shall also trigger economic activity for 50000 people over the development and operation period. The SE-TP, along with IRC-CoE&IDC initiative, is in perfect congruence with the vision 2041, Delta Plan of GoB and contribute to UN SDGs.

# Chapter - 1

## Introduction

### 1.1. Project background

Tourism has become the world's largest industry, generating wealth and employment. Tourism, as an instrument of economic development, will steadily take even greater importance in the future. Tourism is an economic and social phenomenon. There are grounds for optimism about the economic benefits from the tourism sector to the developing countries.

Tourism is a major phenomenon of modern society and has emerged as an economic activity of immense global importance. As observed by United Nations World Tourism Organisation (UNWTO), over the decades, the tourism sector has experienced continued growth and deepening diversification to emerge as one of the fastest-growing economic sectors in the world and modern tourism is closely linked to development and encompasses a growing number of new destinations. These dynamics have turned tourism into a key driver for socio-economic progress. Perhaps there is hardly any other field of activity where so many people are involved directly or indirectly. Tourism has found a niche for itself as an effective instrument for generating employment, earning revenue and foreign exchange, enhancing environment preserving culture and tradition, thereby facilitating overall development.

Tourism sector integrates a wide range of economic activities and is now regarded as the world's largest industry. The dramatic growth of tourism over the last 50 years is one of the most remarkable economic and social phenomena of the period. Economic diversification and technological improvement have created a conducive environment for tourism development in the present age of globalisation. Bangladesh and South East Asia have been gearing up to

achieve significant progress in this field owing to a number of encouraging factors. Bangladesh has a vast geographical spread and great historical and cultural heritage, which are excellent conditions for growth in this sector.

The immense potential of the tourism sector to act as a catalyst of economic and social development has been acknowledged in national and international forums. International tourist arrivals (overnight visitors) grew 4% in January-March 2019 compared to the same period last year, below the 6% average growth of the past two years. The Government of Bangladesh (GoB) have placed tourism on a priority platform, making efforts to sustainably explore and utilise the tourism resources and potential offered by the country. In order to develop the tourism sector in a sustainable manner and enhance the local socio-economic impact from tourism, GoB has made tourism a priority in national development policies and formulating and implementing interventions to increase tourism's contribution to poverty reduction.

An analysis of the growth of tourism reveals that this is due to three factors:

- a) Social factors that enhance demand;
- b) Technology, which makes travelling easier; and
- c) Information technology, which transforms the selling strategy of tourism.

The innovations of new products (rural tourism, infotainment, selling holidays by new methods, time-share resorts, etc.) played their own role in the development of the industry. The development of tourism is characterised by the continuous expansion of area and diversification of destinations. All these increased the demand

for tourism, which is determined mainly by the wealth of the tourist.

Tourism sector has witnessed an innovative mould presenting a new perception with development of qualitative trends which include the development of the concept of sustainable tourism, increased market segmentation, development of new forms of tourism, especially those related to nature, ocean wealth, wildlife, rural areas, culture, arts & crafts, heritage, sustainable tourism, eliminating poverty etc.

Tourism has been identified by the United Nations (UN) as one of the ten sectors to drive the change towards a Green Economy and was included in the Rio+20 Outcome Document as one of the sectors capable of making “a significant contribution to the three dimensions of sustainable development, has close linkages to other sectors, and can create decent jobs and generate trade opportunities.”

Bangladesh is a country of natural beauty, hilly mountains, longest beach, favourable climate, six seasons which are the key factors in developing eco-tourism, sustainable tourism and rural tourism. Bangladesh has many archaeological and historical sites too. The hospitality of people and local culture, lifestyle is a unique selling point. Tourism is a growing industry in Bangladesh. The development of the tourism sector and the overall development of tourism destination is Bangladesh’s key priority and a strategic objective for the diversification of the Bangladesh economy.

Bangladesh generated 1,25,000 international tourists in 2014, and international tourism generated US\$ 1.5 trillion in export earnings, and international tourist arrivals grew by 4.3% in 2014 to 1.133 billion. According to World Travel and Tourism Council (WTTC), direct employment support by travel and tourism is forecast to rise by 2.9 per cent per annum to 1,785,000 jobs or 1.9 per cent of total employment in 2023.

The GoB’s objective is, therefore, to maximise the potential direct and indirect impacts through a more modern regime of Economic

Zones (EZs) including Tourism SEZ. As such, the GoB has developed a new EZ paradigm in Bangladesh, drawing from numerous successful examples from around the world, as well as, borrowing from Bangladesh’s own positive experience with the export promotion zone model. In addition, the GoB is expecting additional spillover effects to local firms stemming from new foreign direct investment (FDI) and from more investment within value chains. This will, in turn, stimulate the procurement of more local products and produce better linkages between firms and educational institutions. A faster adaption to international environmental and social practices would also be encouraged through this new EZ policy regime.

In addition, the new EZ regime provides for a new approach both in management and investment. The policy allows the GoB to develop and pilot an approach that is less reliant on Government and fiscal subsidies while leveraging comparative advantages and private sector capability, where possible.

In August 2010, the Economic Zone Act was passed in Parliament, providing the overall framework for establishing EZs throughout Bangladesh. Under this Act, the Economic Zone Authority (BEZA) was established under the Prime Minister’s Office (PMO) and governed by a Board chaired by the Prime Minister. The law provides the legal coverage for attracting and leveraging private investment in the development of economic zones as zone developers or operators and in the provision of providing infrastructure services, such as connecting roads, power, water supply, wastewater treatment etc. The law also allows for the development of SEZs and support infrastructure through a Public-Private Partnership (PPP) mechanism.

The GoB, in its endeavour to promote sustainable tourism, intends to develop the Sonadia Island, as an international eco-tourism destination. The sustainability in tourism involves holistic and interdisciplinary approach encompassing sustainable management of resources, enhanced business sustenance, ensuring sustained interest of tourist, continued up-gradation of facilities, socioeconomic impacts,

cultural impacts, environmental impacts (including responsible consumption of resources, reducing pollution, and conserving biodiversity and landscapes) and compliance to the relevant UN-SDGs. The proposed Sonadia Eco-Tourism Park (SE-TP) lies in the Sonadia Island of Cox's Bazar District in Chittagong Division of Bangladesh. One of the biggest Tourism SEZ to be supported by BEZA is the SE-TP project which is 3 km North of Cox's bazar under Maheshkhali Upazila, which will be a large-scale tourism development containing both public and private investment. Blessed with several natural features like mangrove forest, the sight of birds, endangered species, red crabs, turtles, SE-TP, can offer immense potential to emerge as a leading tourist destination in the world. This project is to be developed over the long-term, into an Eco-Tourism Park contains different tourism-related facilities. Also, it is proposed to establish an integrated innovation and research hub to support the growth of innovative companies across sectors such as life sciences, green technologies and other such industries and services leveraging the sustainable eco-tourism initiative.

To this end, the BEZA intends to engage the services of a consulting firm to prepare a comprehensive 30-year Master Plan and Development Plan (MP&DP) with supporting infrastructure/utility planning for the SE-TP.

### 1.2. The core objective of the SE-TP

The core objective of the project is to:

- i) facilitate private investment;
- ii) promote tourism in Bangladesh; and
- iii) align tourism facilities with regard to best practices, international compliance, quality standards, building codes, and good social and environmental practices.

The initiative of promoting sustainable SE-TP by the Government of Bangladesh is timely and in perfect congruence with vision 2041, Delta Plan and United Nations sustainable development goals (SDGs).

### 1.3. Engagement project consultant

A consortium of Mahindra Consulting Engineers Limited (MACE), Chennai, India and Dev Consultants Limited (DevCon), Bangladesh, is mandated by BEZA as consultants for the SE-TP through a transparent bidding process, to prepare a comprehensive MP&DP.

The multi-disciplinary team has been formulated comprising of professionals drawn from various disciplines as listed below.

- Team Leader;
- Ecotourism Expert;
- Tourism Facility Planner (Urban Planner);
- Transport Planner;
- Social Expert;
- Environmental Expert
- Infrastructure Expert (Civil);
- Infrastructure Expert (Mechanical);
- Infrastructure Expert (Electrical);
- Infrastructure Expert (Structural);
- Architect;
- Civil Engineer;
- Mechanical Engineer;
- Electrical Engineer;
- GIS Experts;
- 3D Model Maker;
- Economist;
- Videographer; and
- Quantity Surveyor/ Auto CAD Expert.

### 1.4. Scope of services

The brief description and coverage of the scope of services for the assignment are discussed below:

#### ➔ Part I: Due diligence for SE-TP

- Reviewing background materials;
- Benchmarking;
- Products differentiators;
- Stakeholder meetings, stakeholder mapping and consultation;



- Identifying and evaluating the key issues, opportunities, constraints and threats for the new SE-TP project;
- Validation of project assessment and the key issues;
- The generalised conceptualisation of tourism clusters;
- Project concept and rationale for establishing SE-TP;
- Understanding the project environment and key metrics for the adoption of tourism value chain opportunities;
- Analysis of the strategically relevant factors in the macro-environment;
- Vision, mission and value proposition of the SE-TP; and
- Overview of the physical, economic, social, environmental, and programmatic etc. opportunities and constraints.

#### ➤ Part II: Mapping existing conditions for SE-TP

- Analysing existing conditions on land boundaries and topography;
- Analysing existing conditions on land use, moveable and immovable property and infrastructure and utilities;
- Location and linkage strategies;
- Analysis of connectivity regarding road, highway, railway, seaport, airport etc.;
- The site and technical analysis;
- Finalisation of sizing, location, focus and phasing of development;
- Topography;
- Engineering analysis identifying the quality, condition and capacity of existing on and off-site infrastructure and utilities on and surrounding of the site;
- A social and socio-economic survey and an assessment/validation of the existing environmental conditions on the SE-TP site and area of influence;
- Environmental and social review; and

- Infrastructure situation analysis physical, economic, social, and institutional infrastructure.

#### ➤ Part III: Master plan and land use plan of the SE-TP

- Review, validation of the development programme for the SE-TP;
- Analysis of the industry's dominant economic features;
- Sector analysis and project objectives, competitive advantage analysis;
- Strategic mapping, targeting, positioning and product mix;
- Conducting Strength, Weakness, Opportunities and Threat (SWOT) analysis;
- Demand assessment modelling;
- Tourist and transport assessment for SE-TP;
- Definition of land usage;
- Definition of transportation network;
- Project components proposed under the MP&DP;
- Master planning;
  - Planning principles;
  - Planning concepts;
  - Zones spotting;
  - Zoning, product mix and facility configuration;
  - Land-use pattern;
  - Phasing of development;
  - Sustainability initiatives;
- Master plan components.

#### ➤ Part IV: Master plan and infrastructure plan for SE-TP

- Phasing plan;
- SE-TP design guidelines;
- On and off-site infrastructure requirements;
- Infrastructure planning within SE-TP for sustained business;
- Backward and forward infrastructure;
- Identification & location of external infrastructure linkages; and

- Preparation of on and off-site infrastructure;

#### ➔ Part V: Management strategy and promotion for SE-TP

- Preparation of a development management plan;
- The strategy of SE-TP;
- The strategy of integration;
- Analysis of policy framework and regulatory framework.
- Implementation strategy and phasing plan;
- Project structuring;
- Project development strategy and project implementation structure;
- Brand positioning and marketing strategies;
- Implementation schedule and micro-level action plan;
- Government facilitation and approvals;
- Project structuring options, contract packages, deliverables and identifying roles and responsibilities;
- Commitment from various agencies;
- Organisation and management structure;
- Operation and maintenance (O&M) strategy;
- Investment analysis;
- Risks and vulnerabilities analysis and mitigation measures;
- Framework for inclusive development;
- Benefits and contribution;
- Sustainability initiatives and proposal for achieving inclusive growth;
- Branding and marketing materials; and
- Preparation of digital video animation for the SE-TP.

The detailed scope of services is provided in [Annexure - 1A](#).

#### 1.5. Site visit and stakeholder consultation meetings

The initial interaction and deliberations amongst the key staff are essential for directing the thought process of individuals of different expertise and specialisation onto a common platform to achieve the ultimate objective of preparing MP&DP. For successful development and sustained operation of SE-TP, it would be imperative that the planning and configuration exercise must consider the views and opinions of the stakeholders and properly imbibe the inferences of the deliberations as part of the consultation process in the planning stage itself. As a part of this, kick-off meeting and presentation was completed on 22.11.2018 with BEZA. The methodology, work programme and action plans have been presented to BEZA during the meeting.



*Kick-off meeting presentation*



MACE & DevCon and BEZA officials have conducted two days site visit on 23.11.2018 and 24.11.2018. This enabled the team to appreciate the existing ground situation, and the discussion with local people of Sonadia Island offered a defined perspective of a visitor and an occupant of the site. This activity facilitated to analyse the existing site conditions and to frame an appropriate vision of the project.

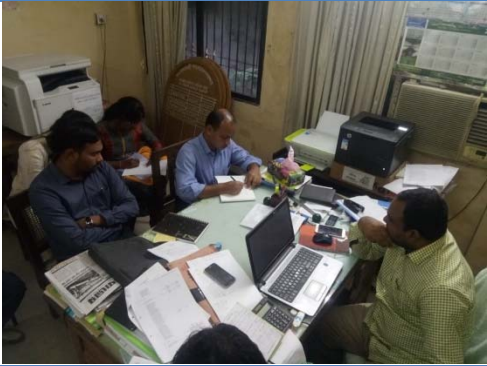






*Site visit with BEZA Officials*



SE-TP is a multi-faceted activity. Many different stakeholders are potentially engaged in the SE-TP or are affected by it, directly and indirectly. MACE & DevCon had formal meetings with BEZA, GoB officials and other stakeholders towards finalisation of project concepts, to understand the key expectations from the project and brief details are provided in [Table No. 1.1](#).

Table No. 1.1: Stakeholder consultation meetings

Date	Government officials	Salient information/ data for the development of SE-TP
22 <sup>nd</sup> November 2018	Manager, Bangladesh Parjatan Corporation 	<ul style="list-style-type: none"> <li>Data on the volume of the annual footfall of tourists visiting Cox's Bazar and its surrounding area:               <ul style="list-style-type: none"> <li>Tourism centre at Nijhum Dwip and Hatiya, Noakhali;</li> <li>Tourism centre at an adjacent area of Shekh Hasina Bridge of Mohananda River at Chapai Nawabganj; and</li> <li><b>The tourism training centre at Cox's Bazar.</b></li> </ul> </li> </ul>
24 <sup>th</sup> November 2018	Member Engineer – Lieutenant colonel Anwar UI Islam and Town Planner, Cox's Bazar Development Authority (CoxDA) 	<ul style="list-style-type: none"> <li>MP&amp;DP of SE-TP need to be in alignment with the Cox's Bazar master plan and the proposals by CoxDA;</li> <li>Discussion on ongoing and proposed projects pertinent to Cox's Bazar; and</li> <li>Inventory of compatible and complementary tourism spots in Cox's Bazar District and specified the annual footfall of tourists visiting Cox's Bazar and its surrounding area is approximately 1.5 million.</li> </ul>
24 <sup>th</sup> November 2018	Assistant Engineer, Department of Public Health Engineering (DPHE), Cox's Bazar	<ul style="list-style-type: none"> <li>Sonadia Island has three numbers of tube wells, and its maximum depth is about 1000 ft; and</li> <li>The groundwater is saline in nature and suggested to rely on</li> </ul>

Date	Government officials	Salient information/data for the development of SE-TP
		<p>desalination plant while developing MP&amp;DP for SE-TP.</p>
25 <sup>th</sup> November 2018	<p>Assistant Director, Department of Environment (DoE), Cox's Bazar</p> 	<ul style="list-style-type: none"> <li>• <b>Total land of Sonadia Island</b> as per record is <b>4916 hectares</b>. Out of which 50% of the land is under the process of acquirement by BEZA for Eco-Tourism project;</li> <li>• <b>Turtle hatcheries</b> are developed in the Sonadia Island, in which 1200 egg hatched last year; and</li> <li>• Also described the process of applying for environmental clearance.</li> </ul>
12 <sup>th</sup> December 2018	<p>Assistant Director (GIS), Department of Disaster Management (DDM)</p> 	<ul style="list-style-type: none"> <li>• Discussed on studies conducted on multi-hazard, vulnerability and risk assessment.</li> </ul>
13 <sup>th</sup> December 2018	<p>System Analyst, Bangladesh Water Development Board (BWDB), Dhaka</p>	<ul style="list-style-type: none"> <li>• Collected rainfall (mm) data from January 1987 to October 2018; and</li> <li>• Collected water level (m) non-tidal (m) &amp; water level (m) tidal max and min water level (m) data from January 1969 to October 2018.</li> </ul>

Date	Government officials	Salient information/data for the development of SE-TP
		
3 <sup>rd</sup> October 2019	<p>Tour Operators Association of Cox's Bazar (TOAC)</p> 	<ul style="list-style-type: none"> <li>• October-March witness larger inflow of incoming tourists;</li> <li>• Mode of the visit from other locations include: (i) non-AC bus, (ii) AC bus, (iii) private transport, (iv) picnic bus, (v) airlines (10 flights operate presently), etc.;</li> <li>• Appropriately 1000 buses travel from Chittagong to Cox's Bazar; and</li> <li>• Existing available transport facility can serve comfortably up to 20,000 tourists; on the other hand, during peak season, the tourists' arrival peak up to 50,000.</li> </ul>
3 <sup>rd</sup> October 2019	<p>General Manager of Cox's Bazar Palli Bidyut Samiti, Rural Electrification Board (REB)</p> 	<ul style="list-style-type: none"> <li>• Kiranthuli sub-station identified as the source of power supply to SE-TP. The capacity of sub-station is 10 mVA;</li> <li>• Other sub-stations in the region are: <ul style="list-style-type: none"> <li>▪ Gorakghata zonal office sub-station of 10 mVA capacity;</li> <li>▪ Nolbela sub-station of 10 mVA capacity;</li> <li>▪ Dhaulghata sub-station for EZ is under progress; the land filling is completed. The likely capacity is 10 mVA but proposal to establish 20 mVA is under review; and</li> <li>▪ Proposed Sonadia sub-station shall be 10 mVA, and land allocation to establish the proposed sub-station is likely to be provided by BEZA.</li> </ul> </li> </ul>
3 <sup>rd</sup> October 2019	<p>Environmental and Hydrogeologist officials – DPHE</p>	<ul style="list-style-type: none"> <li>• To meet the non-potable water demand of the proposed project, desalination may be considered; and</li> </ul>

Date	Government officials	Salient information/data for the development of SE-TP
		<ul style="list-style-type: none"> <li>• In Maheshkhali, the aquifer water level is in good condition. Since Maheshkhali is adjacent to Sonadia Island, the potable water requirement can be met through installing deep tube-well in Maheshkhali and water trunk line may be established to meet the water demand of Sonadia Island.</li> </ul>
7 <sup>th</sup> February 2019	Assistant Engineer, Roads and Highways Department (RHD)	<ul style="list-style-type: none"> <li>• Discussion on ongoing and proposed projects pertinent to Cox's Bazar region; and</li> <li>• As per the 5th-year plan, the existing Chittagong to Cox's Bazar road will be upgraded from 2-lane to 4-lane.</li> </ul>
10 <sup>th</sup> February 2019	General Manager and Project Director, Dohazari-Cox's Bazar Railway Project	<ul style="list-style-type: none"> <li>• Construction works for the 102 km Chittagong to Cox's Bazar dual gauge track is on progress; and</li> <li>• The rail line is expected to complete within 2022.</li> </ul>
3 <sup>rd</sup> February 2019	Project affected persons (PAPs) 	<ul style="list-style-type: none"> <li>• The views of PAPs and the interventions planned for rehabilitation, skill development and capacity building of PAPs are dovetailed in the MP&amp;DP.</li> </ul>

The discussion with the stakeholders improved better understanding of the ground situation, facilitated collection of various information/data, deeper understanding of the influencing factors both on-site and off-site, existing developments around the District, and stakeholder's needs and expectations from the proposed SE-TP. Based on the input and feedback from the consultation, the MP&DP has been prepared. The details of stakeholder consultation

and relevant considerations are incorporated in the report.

### 1.6. The structure of the MP&DP report

The study includes the due diligence, mapping existing conditions, preparation of master plan and land use plan, infrastructure plan, management strategy and promotion for SE-TP in line with Terms of Reference (ToR). The study dwells into details of developing sustainable

smart Eco-Tourism clusters, having not only substantial potential for attracting domestic tourists but also offers enormous opportunities for foreign tourist attraction and the strategies towards this end are discussed in this report. A holistic approach is adopted in terms of seamless integration of leisure, entertainment, education, research, capacity building and skill development. In this context, a state-of-the-art innovation and research centre (IRC) to promote knowledge-based green economy is also planned within SE-TP. The IRC shall have multiple centres of excellence (CoE) for housing domestic and international companies engaged in innovative, sustainable and clean technologies, and research activities & sustainable solution providers. Apart, IRC shall house international design centre (IDC) to facilitate design, engineering, technical, consulting, advisory & research services. Thus IRC-CoE&IDC shall serve as a catalyst to foster innovation and to emerge as a regional centre of

innovation and knowledge creation. Sustainable tourism takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities. Thus well-conceived tourist-centric concepts and knowledge workers conducive business environment strategies are incorporated to position SE-TP as a world-class tourism and knowledge-based economy destination while conserving and protecting biodiversity, cultural values and national pride. The strategies are evolved to trigger economic growth, rural development, create large scale local and regional employment opportunities and promote inclusive growth through SE-TP initiative.

**Exhibit No. 1.1** presents the structure of the comprehensive MP&DP of SE-TP, including IRC-CoE&IDC.

**Exhibit No. 1.1: Structure of the comprehensive MP&DP**

Chapter 1 - Introduction	<ul style="list-style-type: none"> <li>○ This chapter deals with an introduction to the project proposal, objectives underlying the project concept and the format of the report with an introduction to each chapter.</li> </ul>
Chapter 2 - Detailed activities and approach methodology	<ul style="list-style-type: none"> <li>○ This chapter deals with the detailed activities about the development of SE-TP, including IRC-CoE&amp;IDC, along with the approach methodology adopted for the study.</li> </ul>
Chapter 3 - Tourism profile of Bangladesh, Cox's Bazar and its surrounding	<ul style="list-style-type: none"> <li>○ Bangladesh is a country of natural beauty, hilly mountains, longest beach, favourable climate, six seasons which are the key factors to develop Eco-Tourism, sustainable tourism and rural tourism;</li> <li>○ The chapter presents an insight into the country's tourism potential;</li> <li>○ The Bangladesh tourism industry performance, growth opportunities, sector profile for both domestic and foreign tourist is reviewed;</li> <li>○ This chapter also essentially deals on Bangladesh tourism performance, its growth profile and its commendable performance;</li> <li>○ MACE considered pertinent to review some of the surveys conducted on Bangladesh tourism in the context of the proposed SE-TP as these surveys could lead to the visitor's profile, arrival patterns and spending capacity, etc.;</li> <li>○ SE-TP on a standalone basis is sure to attract visitors from the influence zone, the visitation by the foreign and domestic tourist. However, a visitor especially having a long duration tour, would like to cover tourism spots as much as possible of their liking. The visits to Bangladesh in general and visit to Cox's Bazar in particular by the domestic and foreign tourist will depend on other tourist attraction facilities available. Hence, detailed insight into the existing tourist attraction in Cox's Bazar which can be supplementary and complementary to the proposed facility is necessary, and the same is presented in this chapter;</li> </ul>

	<ul style="list-style-type: none"> <li>○ Few of facilities may also compete with the proposed facility and planning should address the compatible solutions to combat these competing factors. SE-TP should take the leverage of the complementary and supplementary spots as a part of its marketing efforts;</li> <li>○ Brief District-wise principal tourism assets are discussed in this chapter under heads based on the nature of influence on the proposed facility;</li> <li>○ Cox's Bazar sea beach is the longest beach in the world and is definitely one of the biggest tourist attractions in the country;</li> <li>○ Sonadia Island is one among the tourist's potential in the vicinity of the Cox's Bazar. There is ample scope for expansion of beach tourism, cultural tourism, recreational tourism; city-based economic tourism and Eco-Tourism in the region;</li> <li>○ The detailed analysis of Cox's Bazar and surrounding area tourism potential reveal the unlimited opportunities for promoting sustainable eco-tourism; and</li> <li>○ The study reveals ample scope for establishing large-scale sustainable eco-tourism cluster initiative in the country and Sonadia Island is capable of attracting domestic and foreign tourist.</li> </ul>
<p>Chapter 4 - Conceptualisation and configuration of SE-TP including IRC-CoE&amp;IDC</p>	<ul style="list-style-type: none"> <li>○ This chapter discusses the constraints and challenges hindering the growth of the sustainable eco-tourism in Bangladesh, and the importance of SE-TP to address the identified challenges and to promote sustainable eco-tourism;</li> <li>○ The key initiative of GoB to establish SE-TP is an important step in this direction to promote sustainable growth in tourism sectors;</li> <li>○ The chapter deals with the concept underlying the development of SE-TP as excellence along with the rationale;</li> <li>○ The chapter also discusses on the conceptualisation and configuration of a state-of-the-art IRC to promote knowledge-based green economy;</li> <li>○ The IRC shall have multiple CoE for housing domestic and international companies engaged in innovative, sustainable and clean technologies, and research activities &amp; sustainable solution providers;</li> <li>○ Apart, IRC shall house IDC to facilitate design, engineering, technical, consulting, advisory &amp; research services;</li> <li>○ The concept underlying the development of IRC-CoE&amp;IDC to serve as a catalyst to foster innovation and to emerge as a regional centre of innovation and knowledge creation are discussed;</li> <li>○ The conceptualisation for achieving safe, climate-resilient and prosperous SE-TP while promoting knowledge, innovation-based green economy through the establishment of IRC-CoE&amp;IDC is discussed at length;</li> <li>○ Further, the chapter deals with the identification of the key factors driving the growth strategy. The discussion also includes the product differentiators, which sets apart the SE-TP development and creates a new paradigm for sustainable eco-tourism in the country along with factors influencing them;</li> <li>○ The initiatives to trigger economic growth, rural development, create large scale local and regional employment opportunities and promote inclusive growth through SE-TP is presented;</li> <li>○ The chapter also highlights the significance of benchmarking for the development; and</li> </ul>



	<ul style="list-style-type: none"> <li>○ The chapter concludes with a brief overview of various development elements comprising of entertainment, leisure, education, research and skill development components.</li> </ul>
<p style="text-align: center;"><b>Chapter 5</b> Vision and mission of SE-TP including IRC-CoE&amp;IDC</p>	<ul style="list-style-type: none"> <li>○ The study encompasses evolving the vision and mission of the proposed SE-TP after a detailed review of key considerations and specific issues;</li> <li>○ The vision, project goals, strategies and sectoral objectives are also spelt with respect to the IRC-CoE&amp;IDC development; and</li> <li>○ Further, the chapter deliberates on short-term, medium-term and long-term goals along with focus area, facilitators, enablers and linkages for the proposed SE-TP.</li> </ul>
<p style="text-align: center;"><b>Chapter 6</b> Tourist survey and projection</p>	<ul style="list-style-type: none"> <li>○ The study had carried out focused group discussion with target visitors of SE-TP and inferences were drawn for assessing the market potential and facility configuration for the proposed SE-TP;</li> <li>○ This chapter summarises the key findings based on the interaction and forms the basis for finalizing the design brief;</li> <li>○ The inflow streams to the proposed SE-TP are identified as people living in the influence zone, foreign tourist and domestic tourist visiting Cox's Bazar District;</li> <li>○ A detailed assessment of the influence zone, the inflow of visitors under various scenarios, is computed;</li> <li>○ Trend analysis of tourist covering growth pattern, nationality, seasonality, destination wise arrival pattern and age profile are discussed;</li> <li>○ Various scenarios for the likely visitation to the SE-TP from the people living in the influence zone, foreign tourist and domestic tourist have been arrived at;</li> <li>○ Growth projections are worked out considering various growth models including the past study recommendations and independent review of past trend and envisaged future growth;</li> <li>○ The resultant effect factor considering growth in visitation, the negative impact of declining interest in any entertainment attraction over a period of time, the positive effect of introducing new themes on a regular basis are determined for each stream of inflow separately.</li> <li>○ The demand assessment has been done considering three different scenarios viz., base case scenario, conservative scenario and aggressive scenario; and</li> <li>○ The detailed analysis is presented in this chapter and demand projected over the horizon period of 30 years.</li> </ul>
<p style="text-align: center;"><b>Chapter 7</b> Benchmarking – Domestic and international comparable</p>	<ul style="list-style-type: none"> <li>○ To make SE-TP as the most attractive tourist destination for both domestic and international tourist, it is planned to provide high-end facilities and components within the park while preserving the bio-diversity, ecology, traditional and heritage values;</li> <li>○ To fulfil this aim, various case studies have been analysed to arrive attractive infotainment product mix to make SE-TP as a unique masterpiece in the world of tourism;</li> <li>○ Strategic benchmarking of international comparable on Eco-Tourism zones and tourist attractions are carried out, and the chapter dwells on various aspects of benchmarking exercise;</li> <li>○ A few successful examples of Eco-Tourism zones/tourist attraction facilities across the world are studied, and as a part of this, the benchmarking exercise for the Eco-Tourism cluster is carried out considering the following parameters:</li> </ul>

	<ul style="list-style-type: none"> <li>○ Review of eco-restoration and conservation;</li> <li>○ Scale;</li> <li>○ Review of various attractive components;</li> <li>○ Facilities;</li> <li>○ Review of pricing;</li> <li>○ Key success factors;</li> <li>○ Rationale;</li> <li>○ Development model;</li> <li>○ Regulation and quality assurance;</li> <li>○ Regulatory framework;</li> <li>○ Collaboration;</li> <li>○ Lessons learnt;</li> <li>○ Performance; and</li> <li>○ Study the facilities in the proven existing Eco-Tourism and analyse the merits/demerits in adopting the same in the regional context.</li> <li>○ SE-TP development is being contemplated as a conducive eco-system comprising of sustainable eco-tourism zone, international tourist attraction facilities, business hub for promoting knowledge-based green economy;</li> <li>○ Hence, the benchmarking exercise is categorised and discussed under the following four groups: <ul style="list-style-type: none"> <li>1. Distinct ecosystems having tourism as a major growth engine;</li> <li>2. International tourist attraction facilities;</li> <li>3. Tourism based EZs; and</li> <li>4. International innovation &amp; research hubs.</li> </ul> </li> <li>○ In-depth analyses of international comparable models are presented as a part of benchmarking exercise;</li> <li>○ The chapter discusses the parameters selection, their rationale, detailed analysis of selected models, success ingredients, etc.;</li> <li>○ The key findings of the benchmarking exercise are also presented to facilitate planning and development of the proposed SE-TP including IRC-CoE&amp;IDC; and</li> <li>○ Inputs from the benchmarking exercise are dovetailed in the master plan and design brief of the SE-TP, including IRC-CoE&amp;IDC.</li> </ul>
<p><b>Chapter 8</b> <b>Site analysis</b></p>	<ul style="list-style-type: none"> <li>○ This chapter provides details on one of the important elements of the development, i.e. site features mapping and analysis;</li> <li>○ Analysis of site is a pre-requisite task for effective planning;</li> <li>○ Accordingly, planning and development issues, opportunities prevailing in the project area and its surroundings have been identified;</li> <li>○ Also, development pattern and future direction of its' growth have been determined;</li> <li>○ The issues and constraints bearing on decision making in setting proposals for future development have been analysed;</li> <li>○ The chapter presents the salient features of the identified location regarding its connectivity, bio-diversity, ecological features, sensitive features, infrastructure availability, constraints and opportunities with an emphasis on the mitigation measures to be adopted to overcome the constraints; and</li> </ul>

	<ul style="list-style-type: none"> <li>○ SE-TP thrives on-site features and assets, such as the natural environment, a warm climate, rich cultural heritage and plentiful human resources, thus positioning SE-TP in comparative advantage.</li> </ul>
<p style="text-align: center;"><b>Chapter 9</b> <b>Transportation plan</b></p>	<ul style="list-style-type: none"> <li>○ To cater to the increase in the number of tourists, required level of transport facilities needs to be provided for the tourists and this chapter present the transportation plan;</li> <li>○ In-depth analysis of the connectivity of Cox's Bazar and connectivity between Cox's Bazar and Sonadia Island is presented in this chapter;</li> <li>○ There is a requirement for the development of bridge over Maheshkhali channel connecting the mainland with the proposed railway line and highway N1 (connecting Chittagong with Cox's Bazar) and the chapter dwell on these aspects;</li> <li>○ The proposed railway line has not been directly linked to Sonadia Island, and it can be reached through approach road and Zila road of Maheshkhali Island. This has been proposed considering the possible environmental impact such as noise and vibration due to train movements which may affect the sensitive bio-diversities of Sonadia Island, and the chapter discusses these issues as well;</li> <li>○ From Maheshkhali Island, it is suggested that the tourists can use the battery-operated vehicle to reach Sonadia Island. There are 2 number of jetties proposed-one at Sonadia Island and one at Cox's Bazar to exclusively facilitate the tourist's movement to Sonadia Island through waterway from Cox's Bazar and the chapter present these details;</li> <li>○ An embankment cum spinal road of 7.5 m wide running for a length of 17.9 km has been proposed linking the proposed jetty at the Southern tip of Sonadia Island. This spinal road is proposed to be connected with the footpaths/internal driveway for NMT vehicles. Provision for cycle tracks and pedestrian path have been proposed parallel to the main trunk road, and these aspects are discussed in the chapter;</li> <li>○ Transport network with adjacent tourism spots are also presented in the chapter;</li> <li>○ In-depth analysis of transport infrastructure in terms of the status of road communication on Dhaka-Chittagong-Cox's Bazar-Teknaf Corridor, upgrading and construction of new transport infrastructure, road access to Sonadia Island from Chittagong- Cox's Bazar highway, road network within Cox's Bazar city to facilitate tourist movement are presented in the chapter;</li> <li>○ The chapter also presents the estimation of tourists for Cox's Bazar for transportation planning;</li> <li>○ Further, the transport facilities from Dhaka to Cox's Bazar corridor, transport need of the people accommodated in the resettlement area, transportation between Cox's Bazar and Sonadia Island in terms of e-vehicle, battery cars, speed boats, road hierarchy and transport facilities within Sonadia Island and transport facilities within Sonadia Island are analysed and presented in the chapter; and</li> <li>○ Transport management plan in terms of transport development approach, parking facilities and management, safety and security, and transport-related information for tourists are also discussed.</li> </ul>
<p style="text-align: center;"><b>Chapter 10</b> <b>Master plan of SE-TP</b></p>	<ul style="list-style-type: none"> <li>○ Sustainable eco-tourism, through SE-TP initiative, is a vehicle to foster economic and social growth of Bangladesh, through the achievement of the development imperatives, while minimizing negative social, cultural and environmental impacts;</li> </ul>

- The importance of the master planning exercise can be understood and appreciated by the fact that it provides a clear and precise blueprint for undertaking the development process;
- The planning principles envisioned to be implemented in this uniquely conceived SE-TP, turn it into a fully integrated functionally best facility and to promote a new tourism image in Cox's Bazar, as well as to develop confidence for investors to undertake the development of the tourism project components and subsequent operation of their businesses;
- The SE-TP is a self-contained region with a salubrious surrounding and will eventually emerge as a "Sustainable-holistic-smart- intelligent-Eco-Tourism zone".
- This chapter discusses the structure of SE-TP master plan, objectives of the master plan and planning framework, planning considerations, zones spotting, land use pattern and space allocation, development plan, phased development etc.;
- Based on the demand assessment, benchmarking analysis of international comparisons, primary survey etc. a detailed master plan is prepared to have an optimum mix of tourist attraction facilities (TAF) and other tourism-related facilities while ensuring the principles of sustainable eco-tourism;
- The planning of installations of allocated Tourism and Knowledge Zone Component (TKZC) shall be the responsibility of the respective private companies/occupant units. However, such planning shall adhere to overall regulations and stipulations laid by SE-TP development authority;
- A structured process is adopted for evaluating the themes and attractions based on adherence to a set of compliance criteria and its responsiveness, as it is pertinent that the themes and attractions fulfil the tenets of sustainable eco-tourism and promotion of knowledge-based green economy;
- The proposed zones have been spatially distributed within the proposed SE-TP based on various considerations, and infotainment zones include:
  - Entrance zone;
  - Heritage and hospitality zone;
  - Knowledge centre zone;
  - Family entertainment zone;
  - Adventure zone; and
  - Eco-science zone.
- Multiple TAF and other facilities are proposed under each zone of SE-TP are discussed in this chapter;
- The principles of sustainable eco-tourism are adopted while developing the master plan and sustainability and eco-restoration occupy the centre stage of the entire development and operation cycle;
- Various sustainable eco-tourism elements, sustainability initiatives, biomimicry and circular economy principles have also been incorporated into the planning process to position the development on a sustainable path.
- The presents the sustainable elements conceived in MP&DP, including:
  - Site planning and management including conserving biodiversity;
  - Sustainable transport;
  - Water conservation;
  - Energy efficiency;

	<ul style="list-style-type: none"> <li>○ Material and resource management;</li> <li>○ Waste minimisation technologies;</li> <li>○ Scientific treatment of waste and energy recovery possibilities to reduce power consumption;</li> <li>○ Use of eco-friendly materials;</li> <li>○ Recyclable material;</li> <li>○ Avoidance of toxic chemicals;</li> <li>○ Usage of environmentally friendly products;</li> <li>○ Health and well-being; and</li> <li>○ Green education.</li> </ul>
<p><b>Chapter 11</b> <b>Master plan of IRC-CoE&amp;IDC</b></p>	<ul style="list-style-type: none"> <li>○ The IRC shall have multiple centres of excellence (CoE) focusing on research &amp; innovation activities on emerging areas of national interest and shall provide an intellectually stimulating environment through which professionals from academia, industry, incubators and research laboratories can collaborate on projects of business, government, societal, commercial and national significance;</li> <li>○ Apart, IRC shall house international design centre (IDC) to facilitate design, engineering, technical, consulting, advisory &amp; research services;</li> <li>○ The focus of the IRC-CoE is on innovation and technology-led businesses that enhance Bangladesh competitive advantage and align with the economic, industrialisation, and knowledge development strategy, particularly in areas such as life sciences, alternative &amp; renewable energy, environment technologies &amp; sustainable business practices, advanced materials &amp; innovative products, built environment &amp; sustainable communities;</li> <li>○ Bangladesh is well-positioned to contribute to global engineering research and development as the ecosystem of captive centres, service providers and start-ups, increasingly work together to drive innovation and IRC-IDC shall leverage this conducive environment;</li> <li>○ IRC-IDC shall house cutting edge technology companies engaged in both product &amp; project design, engineering &amp; consulting as well as consulting support services;</li> <li>○ IRC-IDC, as global design and engineering hub of international standards, is poised to attract a wide range of knowledge worker organisations;</li> <li>○ IRC-IDC can also serve as an outsourcing hub for major international design and engineering companies. The occupant units can leverage high-quality skill sets available in the region at an affordable cost and can provide 24x7 services for its clients and projects;</li> <li>○ The chapter deals in detail with the microeconomic scenario of identified sectors and subsectors and their occupancy potential in the proposed IRC-CoE&amp;IDC;</li> <li>○ The focus areas, targeted sectors and infrastructure facilities of IRC-CoE&amp;IDC are detailed in this chapter;</li> <li>○ This chapter deals on the master planning of IRC-CoE&amp;IDC including broad design considerations;</li> <li>○ The master plan proposed for the development of IRC-CoE&amp;IDC is discussed in terms of the attracting business enterprises in sub-sectors of identified sectors, project development needs and planning considerations;</li> </ul>

	<ul style="list-style-type: none"> <li>○ The master planning is envisioned so as IRC-CoE&amp;IDC can achieve the status of a world-class entity within the first decade of its existence. Commensurate with this, IRC-CoE&amp;IDC shall have state-of-the-art construction and inbuilt facilities, global IT connectivity and support structure; and</li> <li>○ The IRC-CoE&amp;IDC shall be planned as an eco-friendly campus by using renewable energy and new technology in the development, and these aspects are discussed as well in this chapter.</li> </ul>
<p style="text-align: center;"><b>Chapter 12</b>  <b>Infrastructure facilities within SE-TP including IRC-CoE&amp;IDC</b></p>	<ul style="list-style-type: none"> <li>○ Provision of infrastructure and facilities is crucial for the sustained development and operation of SE-TP and for the occupant units of IRC-CoE&amp;IDC;</li> <li>○ Identification and planning of various supporting infrastructure and facilities for establishing SE-TP including IRC-CoE&amp;IDC constitute critical tasks;</li> <li>○ Accordingly, the chapter presents the details of SE-TP common infrastructure including specialised tourism infrastructure but outside the periphery of earmarked TKZC zone;</li> <li>○ Also, the chapter presents the details of TKZC common structure, TAF and other facilities within the periphery of earmarked TKZC zone;</li> <li>○ The various supporting infrastructure and facilities in the context of IRC-CoE&amp;IDC for creating a campus of excellence are identified based on the findings of the study;</li> <li>○ The common infrastructure facilities of SE-TP, TKZC common structure, TAF and other facilities, IRC-CoE&amp;IDC shall be regularly maintained and continuously upgraded to be globally competitive;</li> <li>○ The chapter dwells on SE-TP common infrastructure facilities which are grouped under following major heads; <ul style="list-style-type: none"> <li>○ General infrastructure covering boundary wall and fencing; roads; non-motorised transport (NMT); bicycle movement; and pedestrian walkways; non-vehicle streets; smart parking; security and surveillance; robust IT connectivity and digitalisation; specific features for differently-abled;</li> <li>○ Social infrastructure covering training centre, incubation centre; commercial infrastructure zone; utility and support infrastructure zone; innovative use of open space and visible improvement;</li> <li>○ Environmental and green infrastructure covering water treatment; adequate water supply including wastewater recycling and stormwater reuse; drainage; rainwater harvesting; sewerage network; sewage treatment and wastewater recycling infrastructure; sanitation including solid waste management (SWM); composting and environment/pollution abatement structures; assured electricity supply; renewable energy; waste to energy; site energy utilisation; energy-efficient street lighting; and</li> <li>○ Specialised tourism infrastructure.</li> </ul> </li> <li>○ IRC-CoE&amp;IDC facilities shall be regularly maintained and continuously upgraded to be world-competitive. These infrastructure facilities are grouped under major heads like general infrastructure, multi-facility complex, entertainment and social facilities, health areas, parks and sports zone, transportation system, signage's, green infrastructure, specific and specialised infrastructure etc. These are further discussed in this chapter; and</li> </ul>

	<ul style="list-style-type: none"> <li>○ The concept of smart communities is integrated as a part of IRC-CoE&amp;IDC development. Smart communities proposed in the IRC-CoE&amp;IDC are an umbrella of products &amp; services to address the work-life imbalance. These eco-friendly zones are equipped with renewable energy, recycling system, water management, smart grid and new internal public transportation system, etc. It has a holistic approach to cover most aspects to create a serious impact on work-life balance. Smart communities conceived in the IRC-CoE&amp;IDC shall have several unique features. They are compact with vertical developments. The smart communities shall have an efficient public internal transportation system. Extensive usage of digital technology shall be adopted to create smart grids for better management of civic infrastructure. The environmental sustainability elements shall be incorporated like recycling of sewage water, green spaces, cycle tracks and easy accessibility to goods, services and activities designed to foster a sense of community. These smart communities are planned to provide a functional and aesthetically pleasing urban environment creating effective linkages with other surrounding areas in order to effect an integrated total development. The IRC-CoE&amp;IDC shall be maintained along with international standards.</li> </ul>
<p>Chapter 13 SE-TP offsite infrastructure and linkages</p>	<ul style="list-style-type: none"> <li>○ For the sustained business operation of SE-TP and for occupant units of IRC-CoE&amp;IDC, it is pertinent that off-site infrastructure and SE-TP connectivity are adequately addressed, and the chapter provides in-depth analysis of these aspects.</li> </ul>
<p>Chapter 14 Environmental and social assessment</p>	<ul style="list-style-type: none"> <li>○ Special consideration will be given to avoid any degradation to ecology;</li> <li>○ In the SE-TP context, a suitable balance must be established between the three dimensions of sustainability to guarantee its long-term sustenance of SE-TP;</li> <li>○ The poverty reduction, social inclusion and creation of large-scale local employment aspect should include measures to prevent or minimise the potential negative social impacts of SE-TP;</li> <li>○ This chapter provides the environmental and social (E&amp;S) assessment, the methodology of E&amp;S review, an overview of environmental, legal, regulatory and policy requirements, baseline data, conservative measures, impact assessment, mitigation measures based on the studies and inferences drawn at feasibility level of investigation;</li> <li>○ Considering the sensitivity of the proposed site, it can be said that overall the impacts from pre-construction, construction and operation phase will have quite detrimental impacts to the surrounding environment;</li> <li>○ Many of the impacts are possibly irremediable in nature and can't be replenished, and the proposed site is quite rich from an ecological point of view;</li> <li>○ A thorough Environment and Social Impact Assessment (ESIA) and Environment and Social Management Plan (ESMP) study needs to be conducted;</li> <li>○ Hence this chapter also gives a brief of the requirements for conducting the ESIA and ESMP;</li> <li>○ The objective of the ESMP is to develop procedures and plans to ensure that the mitigation measures for identified impacts are implemented throughout the project phases. Also, ESMP need to ensure the</li> </ul>

	<p>effective long-term protection of the area and other biotic and abiotic components of the environment; and</p> <ul style="list-style-type: none"> <li>○ The chapter also provides the generalised guidelines for E&amp;S safeguard activities for SE-TP development and operations.</li> </ul>
<p><b>Chapter 15</b> Development strategy and private sector participation</p>	<ul style="list-style-type: none"> <li>○ This project is first of its kind in Bangladesh conceptualised for the sustainable and holistic development of eco-tourism cluster and knowledge-based green economy, and hence appropriate model needs to be developed;</li> <li>○ The development model of SE-TP nodes encompasses options like government interventions or in PPP mode or entirely by the private sector. The PPP model of development of infrastructure projects involving different actors utilises the concepts of Special Purpose Vehicles (SPVs). SPVs are formed specifically for the identified projects and are the legal entities implementing and operating the project;</li> <li>○ This chapter presents details of development strategy and options, project structure and SPV;</li> <li>○ The development of the SE-TP common infrastructure shall be under the control of the Project Implementation Unit (SE-TP:PIU) created within BEZA to manage the implementation of SE-TP. The PIU being formed under BEZA shall have representatives from GoB and the District level authorities;</li> <li>○ The O&amp;M of the SE-TP common infrastructure shall be under the control of SE-TP:SPV. The SE-TP:SPV will be entirely a private sector entity;</li> <li>○ The execution of SE-TP connectivity and external infrastructure shall be through the third party, and SE-TP:PIU shall actively involve in monitoring the progress of these activities and perform effective coordination for timely completion of these activities;</li> <li>○ The development and management of TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries shall be under the control of separate SPV (TKZC:SPV) and shall be monitored by government agencies like GoB and BEZA;</li> <li>○ The chapter deals with different scenario options on the extent of participation from GOB through SE-TP:PIU and involvement from the private sector, including roles and responsibilities in the development and operations of the proposed TKZC. The TKZC development options include; <ul style="list-style-type: none"> <li>● Option 1 - 100% owned and managed by GoB through a designated nodal agency, SE-TP:PIU and SE-TP:SPV;</li> <li>● Option 2 - PPP structure with SE-TP:PIU, SE-TP:SPV having 26% equity participation;</li> <li>● Option 3 - Involvement of SE-TP:PIU, SE-TP:SPV, financial institutions &amp; banks, a consortium of private investors - Engineering, Procurement and Construction (EPC) and O&amp;M through professional agencies; and</li> <li>● Option 4 - 100% under private sector.</li> </ul> </li> <li>○ The discussion also includes a detailed methodology for the selection of a strategic partner for TKZC:SPV; and</li> <li>○ The chapter also analyses the strategic linkages and cooperation areas.</li> </ul>



<p><b>Chapter 16</b> Governance, management structure and policy framework</p>	<ul style="list-style-type: none"> <li>○ This chapter presents details of SPV, the roles and responsibilities of various agencies in developing and managing SE-TP;</li> <li>○ The chapter dwells on: <ul style="list-style-type: none"> <li>● SE-TP:PIU – scope and mode of execution;</li> <li>● SE-TP:SPV – scope and mode of execution;</li> <li>● The scope of TKZC:SPV and mode of execution;</li> <li>● The scope of other agencies; and</li> <li>● Specific exclusion from the scope of SE-TP:PIU, SE-TP:SPV and TKZC:SPV.</li> </ul> </li> <li>○ The chapter gives the governance and management structure of SE-TP:PIU, SE-TP:SPV, and TKZC:SPV;</li> <li>○ The study also includes activities of the SE-TP:PIU, SE-TP:SPV and TKZC:SPV during the implementation phase and O&amp;M phase; and</li> <li>○ The strategies and policies for SE-TP development and operation are elaborated in the chapter.</li> </ul>
<p><b>Chapter 17</b> Project cost</p>	<ul style="list-style-type: none"> <li>○ The chapter deals with the cost of developing SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure and TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries;</li> <li>○ The chapter dwells on: <ul style="list-style-type: none"> <li>● SE-TP:PIU – scope and mode of execution;</li> <li>● The scope of TKZC:SPV and mode of execution;</li> <li>● The scope of other agencies; and</li> <li>● Specific exclusion from the scope of SE-TP:PIU and TKZC:SPV.</li> </ul> </li> <li>○ The chapter presents the phase-wise project and the development element-wise cost breakup including mode of development; and</li> <li>○ The chapter also provides the details of a) funded by GoB/BEZA and implemented through SE-TP:PIU b) funded by GoB and implemented by third-party respective government agencies c) investment by TKZC:SPV and d) investment by respective private companies in TAF and TKZC.</li> </ul>
<p><b>Chapter 18</b> SE-TP including IRC- CoE&amp;IDC branding and marketing strategies</p>	<ul style="list-style-type: none"> <li>○ A structured programme for the promotion of SE-TP to attract regular visits by domestic and foreign is vital, and this chapter dwells on tourism promotion aspects;</li> <li>○ Further, structured promotion programme for SE-TP assumes significance to attract domestic and global players for ensuring sustained operations especially in the context of TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries and anchor tenant for IRC-CoE&amp;IDC;</li> <li>○ Adopting well planned strategic branding, advertising campaign, and other sales promotion methods to promote this unique concept in identifying the developer/co-developer for TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries and an anchor tenant for IRC-CoE&amp;IDC assumes significance and the chapter deals with these aspects;</li> <li>○ It is pertinent to create an identity and develop a communication strategy to inform target groups including co-developers about the SE-TP initiative;</li> </ul>

	<ul style="list-style-type: none"> <li>○ Good branding provides opportunities for greater collaboration and synergies and endows an external manifestation of strategic intent and creates differentiation in the market; and</li> <li>○ The chapter discusses the marketing strategies, including the action plan.</li> </ul>
<p><b>Chapter 19</b> Implementation schedule and micro- level action plan</p>	<ul style="list-style-type: none"> <li>○ The chapter presents the project timetable for implementation for the SE-TP with a time period for each of the identified activities;</li> <li>○ The chapter provides activities wise time schedule for SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure; and TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries;</li> <li>○ While developing a project implementation plan, due attention for early implementation gained importance, and hence, the study suggested phased development for SE-TP. The chapter also presents the phasing plan; and</li> <li>○ The chapter also provides the action plan on the micro-level basis for the identified activities.</li> </ul>
<p><b>Chapter 20</b> Risk mapping, analysis, and mitigation strategies</p>	<ul style="list-style-type: none"> <li>○ The chapter identifies various risks associated with the project implementation stage and operation stage;</li> <li>○ The chapter presents the SE-TP specific risk matrix modelling;</li> <li>○ The chapter also includes Porter's five forces modelling to determine the attractiveness of SE-TP and construct a sustainable competitive position for the SE-TP-PIU, SE-TP:SPV and TKZC:SPV among competitors.</li> </ul>
<p><b>Chapter 21 –</b> Benefits and contribution</p>	<ul style="list-style-type: none"> <li>○ The establishment of SE-TP contributes to the growth of the sustainable eco-tourism and knowledge-based green economy sector in many aspects;</li> <li>○ The successful implementation of the SE-TP shall significantly improve the prospects of tourism and knowledge-based sectors in terms of enhanced revenues to the rural communities, tourism value chain actors, increased value-added opportunities, foreign exchange earnings, triggering local economy etc.;</li> <li>○ The benefits and the contribution of the SE-TP with respect to various parameters are analysed and presented in this chapter; and</li> <li>○ The chapter also presents the likely contribution of SE-TP to the United Nations Sustainable Development Goals (UN SDGs) and likely employment generation based on the interventions proposed for SE-TP.</li> </ul>

## Chapter - 2

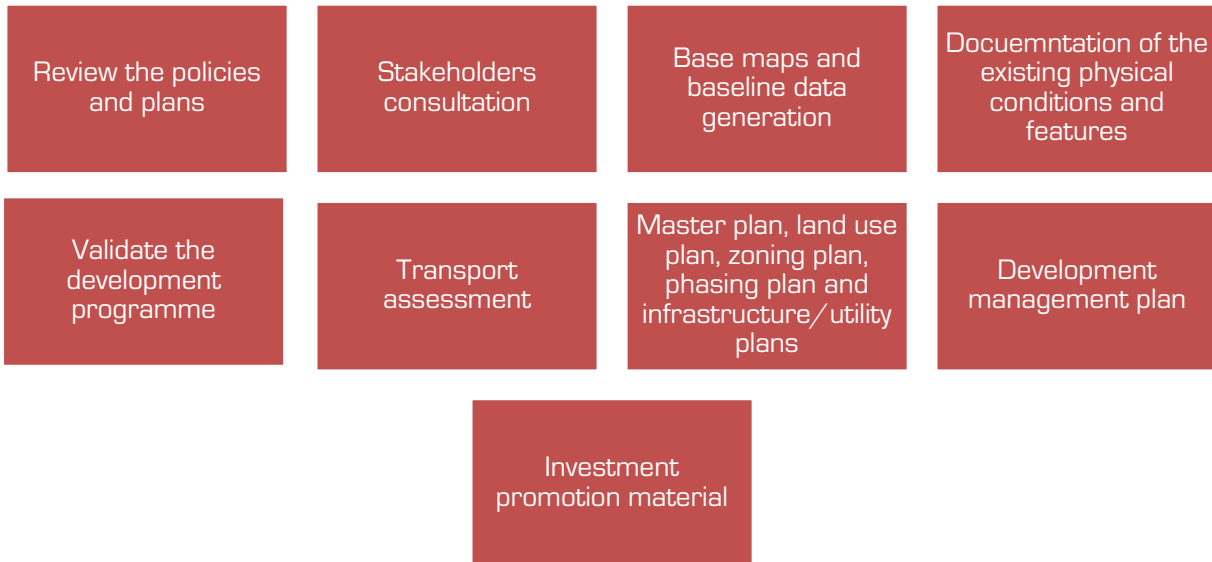
# Detailed activities and approach methodology

### 2.1. Objectives of the assignment

The main objective of this assignment is to conduct in-depth analysis of i) examining the SE-TP site; ii) documentation of its existing facilities of

the area; iii) identification of opportunities and constraints of the site for SE-TP, and iv) preparation of a thirty-year MP&DP for SE-TP, more fully described in **Exhibit No. 2.1**.

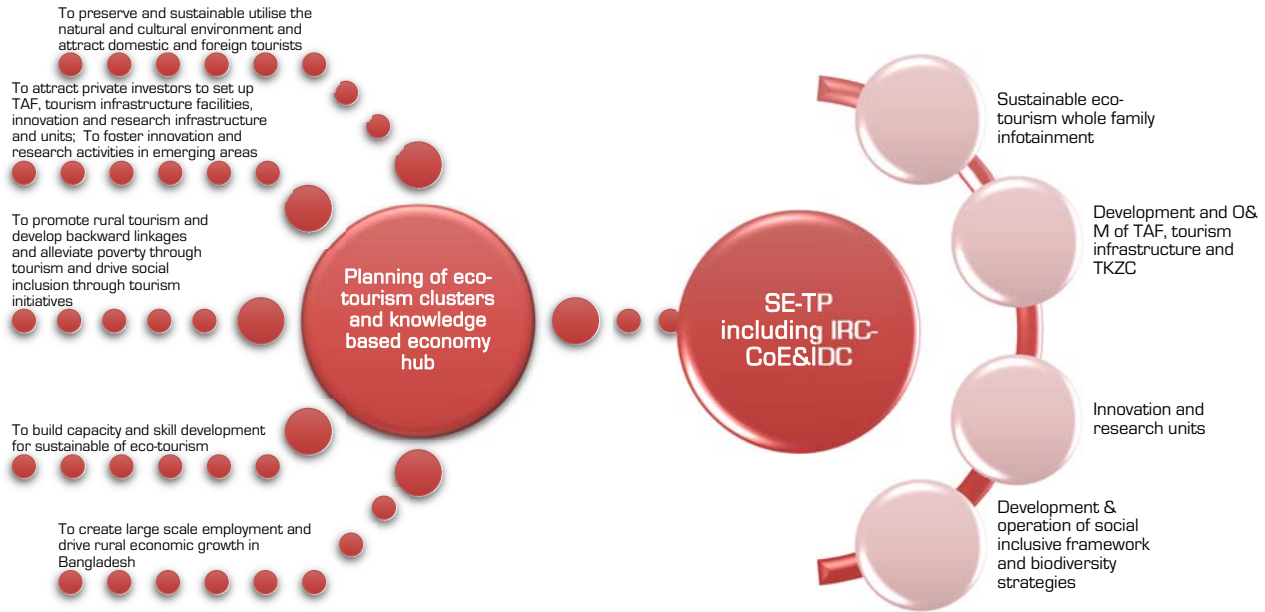
**Exhibit No. 2.1: Objectives of the assignment**



*Source: ToR*

### 2.2. Broad objectives of SE-TP

The broad objectives of SE-TP are depicted in **Exhibit No. 2.2**.



*Source: MACE analysis*

The prime objectives of the proposed IRC-CoE&IDC are to advance knowledge in life sciences, alternative & renewable energy, environment technologies & sustainable business practices, advanced materials & innovative products, and built environment & sustainable communities. The IRC-CoE&IDC shall also host cutting edge technologies companies in the field of product design and engineering, project design and engineering, consulting and advisory services.

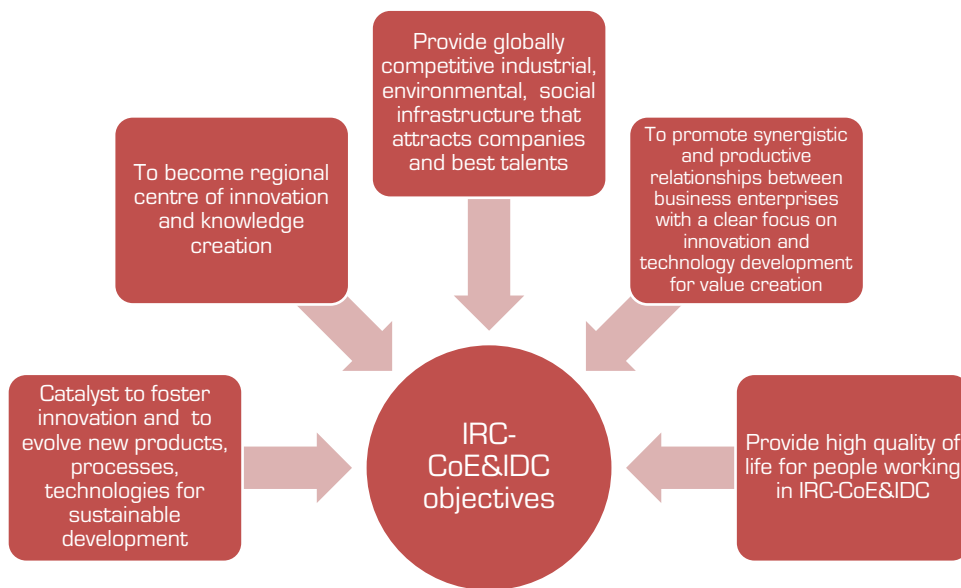
IRC-CoE&IDC is to emerge as a world-class innovation hub and create an ecosystem where organisations, R&D academic institutions, industrial bodies, Government, etc. are engaged in a seamless manner for bringing out innovative products and services, skill development, consulting & advisory services, R&D projects and projects of national importance. This will be

founded on an ideal platform of education and research and aimed at global excellence with local relevance. The IRC-CoE&IDC, while sustaining the highest level of work-life balance, shall contribute to the development of the people of Bangladesh. The IRC-CoE&IDC shall innovatively develop a flexible and modular approach, which are need-based and fulfil the requirements of knowledge workers industry in the identified sectors.

The IRC-CoE&IDC shall recognise the importance of the knowledge network and joint research environment. Well-conceived strategies shall be adapted to networking with other institutions, R&D groups and industry both on the domestic and international front.

The objectives of the IRC-CoE&IDC development are shown in **Exhibit No. 2.3**.

Exhibit No. 2.3: IRC-CoE&IDC objectives



Source: MACE analysis

2.3. Study coverage

Exhibit No. 2.4 highlights the major study areas and coverage. The study evolved strategies for sustainable eco-tourism and the creation of large-scale employment generation.

Exhibit No. 2.4: Study coverage

Tourism sector potential	Stakeholder mapping and consultation	Strategic positioning of the project	Conceptualisation and configuration of eco-tourism cluster of excellence	Conceptualisation and configuration of innovation and research cluster of excellence	Extensive baseline data generation
Site and technical analysis	Demand modelling	Demand assessment for facilities	Assessment of demand and determination of optimum capacities of essential infrastructure/utility services	Demand and supply gap and finalisation of requirements and build up strategies	Tourism development plan/master plan with supporting elements
Infrastructure and facilities within project site	Infrastructure gap analysis – off-site, connectivity and linkages	Environmental and social review and impact assessment	Development of phasing and prioritisation plan	Project investments and economic impacts	Management and institutional aspects
Sustainability initiatives and proposal for achieving inclusive growth	Implementation schedule and micro level action plan	Development strategy, project implementation structure, branding and marketing strategies	Policy framework	Risk mitigation plan	Social inclusion strategies and backward integration
		Benefits and contribution	Tourism investment promotion videos		

Source: MACE analysis

## 2.4. Approach methodology for the study

Strategies for sustainable eco-tourism and the creation of large-scale employment generation through the development of SETP, including IRC-CoE&IDC are evolved through a structured process. Exhibit No. 2.5 and 2.6 depicts the approach methodology adopted for the assignment study and systematic conceptualisation and innovative approach for

sustainable eco-tourism. The approach methodology aims to formulate the flow for carrying out the assignment and tasks as per the scope of services. While formulating this methodology, it is ensured that the final deliverables are oriented towards sustainable development of ecotourism and subsequent operations with an innovative and implementable concept.

Exhibit No. 2.5: Approach methodology



Source: MACE analysis

## Exhibit No. 2.6: Systematic approach and studies



Source: MACE analysis

## 2.5. Work breakdown structure

Exhibit No. 2.7 details the work breakdown structure, including twenty-three (23) stages adopted for the study. However, these steps are not sequential, and a chapter in this report may cover and combine several stages or may cover a part of a stage. The certain stages, not specifically covered in this report, shall form part of the subsequent report and deliverables.

## Exhibit No. 2.7: Stage wise activities

### Stage and micro-level activities

Stage 1 - Study of sustainable eco-tourism clusters

#### Micro-level activities:

- o Situation analysis of the tourism sector, country sustainable eco-tourism growth enablers;
- o Sustainable eco-tourism - a brief overview;
- o Success models and international experience of large-scale sustainable eco-tourism clusters; and

Stage and micro-level activities
<ul style="list-style-type: none"> <li>Lessons learnt from other countries and implications for the District and country.</li> </ul>
<p><b>Stage 2 - Study of sustainable innovation and research hub</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>Situation analysis of the knowledge-based economy sector, country sustainable green economy growth enablers;</li> <li>Success models and international experience of large-scale sustainable research hubs; and</li> <li>Lessons learnt from other countries and implications for the District and country in the field of the knowledge-based green economy.</li> </ul>
<p><b>Stage 3 - Tourism potential of Bangladesh and Cox's Bazar District</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>Bangladesh tourism assets and the country's tourism potential;</li> <li>Key factors in developing eco-tourism, sustainable tourism and rural tourism;</li> <li>Bangladesh tourism industry performance;</li> <li>Growth opportunities;</li> <li>Sector profile;</li> <li>Profile of domestic and foreign tourist; and</li> <li>Scope for establishing large-scale sustainable eco-tourism cluster initiative in the country.</li> </ul>
<p><b>Stage 4 - Stakeholder mapping and consultation</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>Stakeholder mapping;</li> <li>Consultation strategy;</li> <li>Stakeholder coordination mechanisms; and</li> <li>Key findings and factors for sustained business.</li> </ul>
<p><b>Stage 5 - Conceptualisation and configuration of SE-TP including IRC-CoE&amp;IDC</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>Key challenges identification;</li> <li>Constraints and challenges hindering the growth of the sustainable eco-tourism in Bangladesh;</li> <li>Macro environment analysis;</li> <li>Eco-tourism cluster concept;</li> <li>Principles of Eco-tourism;</li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>Main driving pillars of SE-TP including IRC-CoE&amp;IDC;</li> <li>Holistic approach for sustainable tourism;</li> <li>State-of-the-art smart, sustainable SE-TP;</li> <li>Key principles of SE-TP including IRC-CoE&amp;IDC with an underlay of private sector involvement;</li> <li>Strategies for the sustenance of the Eco-Tourism cluster;</li> <li>SE-TP including IRC-CoE&amp;IDC objective enablers;</li> <li>Product differentiators;</li> <li>The innovative approach of SE-TP including IRC-CoE&amp;IDC development in contrast to the traditional model;</li> <li>Sector analysis and project objectives, competing forces, competitive advantage analysis;</li> <li>Forces driving the change;</li> <li>Uniqueness and core offering of SE-TP including IRC-CoE&amp;IDC;</li> <li>Analysis of the scope for operation of SE-TP including IRC-CoE&amp;IDC;</li> <li>Major development elements of SE-TP including IRC-CoE&amp;IDC;</li> <li>Identification of the backward and forward linkages; and</li> <li>Analysis of key challenges regarding sustainable project development across the pillars of sustainability</li> </ul>
<p><b>Stage 6 - Identification of thrust areas of IRC-CoE&amp;IDC</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>Study the potential of the identified segments;</li> <li>Identification of similar development;</li> <li>Analysis of growth segments and thrust areas; and</li> <li>Benchmarking studies.</li> </ul>
<p><b>Stage 7 - Evolving vision, mission and alignment of project goals and strategic initiatives with national goals</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>Conceptualisation</li> <li>Focus areas, facilitators, enablers, and linkages of the sustainable eco-tourism and knowledge-based green economy zones;</li> <li>Vision;</li> <li>Mission;</li> </ul>



Stage and micro-level activities
<ul style="list-style-type: none"> <li>○ Goal - short, medium and long-term;</li> <li>○ Development of vision and mission statement, project objectives, identification of project goals and targets; and</li> <li>○ Mapping of strategic initiatives and linkage with national goals.</li> </ul>
<p><b>Stage 8 – Tourism survey and projection</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Focused group discussion;</li> <li>○ Assessment of market potential;</li> <li>○ Facility configuration;</li> <li>○ Key findings for finalizing the design brief;</li> <li>○ Identification of inflow streams to the proposed SE-TP;</li> <li>○ Trend analysis of tourist;</li> <li>○ Growth pattern, nationality, seasonality, destination wise arrival pattern and age profile;</li> <li>○ Various scenarios for the likely visitation to the SE-TP;</li> <li>○ Growth projections;</li> <li>○ Demand assessment:                             <ul style="list-style-type: none"> <li>○ Base case scenario;</li> <li>○ Conservative scenario; and</li> <li>○ Aggressive scenario,</li> </ul> </li> <li>○ Demand projected over the horizon period of 30 years.</li> </ul>
<p><b>Stage 9 - Benchmarking – Domestic and international comparable</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Strategic benchmarking of international comparable on eco-tourism zones and tourist attractions;</li> <li>○ Benchmarking exercise on the following parameters:                             <ul style="list-style-type: none"> <li>● Review of eco-restoration and conservation;</li> <li>● Scale;</li> <li>● Review of various attractive components;</li> <li>● Facilities;</li> <li>● Review of pricing;</li> <li>● Key success factors;</li> <li>● Rationale;</li> <li>● Development model;</li> <li>● Regulation and quality assurance;</li> <li>● Regulatory framework;</li> <li>● Collaboration;</li> </ul> </li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>● Lessons learnt;</li> <li>● Performance;</li> <li>● Study the facilities in the proven existing eco-tourism; and</li> <li>● Analysis of the merits/demerits.</li> </ul> <ul style="list-style-type: none"> <li>○ Categorisation and discussion under the following four groups:                             <ul style="list-style-type: none"> <li>● Distinct ecosystems having tourism as a major growth engine;</li> <li>● International tourist attraction facilities;</li> <li>● Tourism based EZs; and</li> <li>● International innovation &amp; research hubs.</li> </ul> </li> <li>○ In-depth analyses of international comparable models;</li> <li>○ The key findings of the benchmarking exercise; and</li> <li>○ Inputs from the benchmarking exercise for the master plan and design brief.</li> </ul>
<p><b>Stage 10 – Site analysis</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Location detailing and salient features;</li> <li>○ Land detailing;</li> <li>○ Connectivity evaluation;</li> <li>○ Development pattern and future direction of its' growth;</li> <li>○ Salient features of the identified location:                             <ul style="list-style-type: none"> <li>● Connectivity;</li> <li>● Bio-diversity;</li> <li>● Ecological features;</li> <li>● Sensitive features;</li> <li>● Infrastructure availability; and</li> <li>● constraints and opportunities.</li> </ul> </li> <li>○ Mitigation measures to be adopted to overcome the constraints.</li> </ul>
<p><b>Stage 11 – Transportation plan</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Analysis of connectivity of Cox's Bazar;</li> <li>○ Analysis of connectivity between Cox's Bazar and Sonadia Island;</li> <li>○ Intervention analysis;</li> <li>○ Road and waterways connectivity intervention analysis;</li> <li>○ Transportation network within Sonadia Island;</li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>○ Transport network with adjacent tourist spots;</li> <li>○ Analysis of transport infrastructure;</li> <li>○ Estimation of tourists for Cox's Bazar for transportation planning;</li> <li>○ Analysis of transport facilities; and</li> <li>○ Transport management plan.</li> </ul>
Stage 12 - Master planning of SE-TP
<p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Planning principles;</li> <li>○ Goals and objectives of planning;</li> <li>○ Planning concept;</li> <li>○ Planning considerations;</li> <li>○ Multicriteria analysis for themes and facility configuration;</li> <li>○ Responsiveness check;</li> <li>○ Broad design considerations;</li> <li>○ Zones spotting;</li> <li>○ Space allocation;</li> <li>○ Sustainability and biodiversity conservation initiatives;</li> <li>○ Phasing of SE-TP;</li> <li>○ The master plan of development element SE-TP;</li> <li>○ TAF and TKZC - zoning, product mix and facility configuration;</li> <li>○ TAF and TKZC - land-use pattern;</li> <li>○ TAF and TKZC - detailing the locations and sizes of various land uses;</li> <li>○ TAF and TKZC - zoning (tourism, commercial and other supporting facilities); and</li> <li>○ TAF and TKZC - phasing.</li> <li>○ Detailing of <ul style="list-style-type: none"> <li>● Entrance zone;</li> <li>● Heritage and hospitality zone;</li> <li>● Knowledge centre zone;</li> <li>● Family entertainment zone;</li> <li>● Adventure zone; and</li> <li>● Eco-science zone.</li> </ul> </li> </ul>
Stage 13 - Master plan of IRC-CoE&IDC
<p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ The microeconomic scenario of identified sectors and subsectors;</li> <li>○ Identifying the gaps and opportunities;</li> <li>○ Identifying the requirements of the proposed IRC-CoE&amp;IDC;</li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>○ Detailing of the functional &amp; technical requirements for establishing the IRC-CoE&amp;IDC;</li> <li>○ Broad design considerations; and</li> <li>○ The focus areas targeted sectors and infrastructure facilities of IRC-CoE&amp;IDC.</li> </ul>
Stage 14 - Infrastructure and facilities within common areas of SE-TP and within TKZC
<p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Details of SE-TP common infrastructure including specialised tourism infrastructure but outside the periphery of earmarked TKZC zone;</li> <li>○ Details of TKZC common structure, TAF and other facilities within the periphery of earmarked TKZC zone;</li> <li>○ Identification of infrastructure requirements; and</li> <li>○ Analysis of various infrastructure and facilities: <ul style="list-style-type: none"> <li>● General infrastructure;</li> <li>● Social infrastructure;</li> <li>● Environmental and green infrastructure;</li> <li>● Specialised tourism infrastructure; and</li> <li>● IRC-CoE&amp;IDC infrastructure and facilities.</li> </ul> </li> </ul>
Stage 15 - SE-TP off-site infrastructure and linkages
<p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ External linkage to SE-TP - access road; power supply; and telecommunication.</li> </ul>
Stage 16 - E&S assessment
<p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Objective;</li> <li>○ The methodology of E&amp;S review;</li> <li>○ Baseline data;</li> <li>○ Climate and rainfall;</li> <li>○ Soil characteristics;</li> <li>○ Hydrology;</li> <li>○ Ambient air quality;</li> <li>○ Noise level;</li> <li>○ Surface water quality;</li> <li>○ Ecology and biodiversity of the region;</li> <li>○ Socio-economic conditions;</li> <li>○ PAP and Project Affected Families;</li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>○ Demographic features;</li> <li>○ Economic condition;</li> <li>○ Environmental, legal, regulatory and policy requirements and institutional framework;</li> <li>○ Environmental management plan (EMP);</li> <li>○ Conservation measures;</li> <li>○ Social management plan (SMP);</li> <li>○ Specific compliance with the environmental regulations of the Government, World Bank and United Nations Industrial Development Organisation (UNIDO);</li> <li>○ Special consideration to avoid any degradation to ecology;</li> <li>○ Measures to prevent or minimise the potential negative social impacts of SE-TP;</li> <li>○ Approach for Environmental and Social Management Framework (ESMF); and</li> <li>○ Generalised guidelines for E&amp;S safeguard activities for SE-TP development and operations.</li> </ul>
<p><b>Stage 17 - Development strategy and private sector participation</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ The development approach of the SE-TP common infrastructure through SE-TP:PIU;</li> <li>○ The O&amp;M of the SE-TP common infrastructure through SE-TP:SPV;</li> <li>○ The execution of SE-TP connectivity and external infrastructure through the third party;</li> <li>○ Project structuring and structuring of TKZC:SPV</li> <li>○ TKZC development option and strategy;</li> <li>○ The development and management of TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries through TKZC:SPV;</li> <li>○ Different scenario options on the extent of participation from GoB through SE-TP:PIU and involvement from the private sector;</li> <li>○ Strategic partners/developer's selection process for TKZC and selection of a strategic partner for TKZC:SPV;</li> <li>○ Procurement, bidding document and negotiation procedures;</li> <li>○ Strategic linkages;</li> <li>○ Need for partnership with other countries;</li> <li>○ Need for a host of partner countries;</li> <li>○ Likely partnering countries;</li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>○ Memorandum of Understandings (MoUs) with potential partners and countries;</li> <li>○ Opportunities for private sector participation in developing SE-TP and for the occupant units;</li> <li>○ Standards, quality control recommendations; and</li> <li>○ Sustainable Business Model Canvas for SE-TP:PIU, SE-TP:SPV and TKZC:SPV.</li> </ul>
<p><b>Stage 18 - Governance, management structure and policy framework</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Roles and responsibilities of various agencies in developing and managing SE-TP including IRC-CoE&amp;IDC; <ul style="list-style-type: none"> <li>● SE-TP:PIU – scope and mode of execution;</li> <li>● SE-TP:SPV – scope and mode of execution;</li> <li>● The scope of TKZC:SPV and mode of execution;</li> <li>● The scope of other agencies; and</li> <li>● Specific exclusion from the scope of SE-TP:PIU, SE-TP:SPV and TKZC:SPV.</li> </ul> </li> <li>○ Governance and management structure of SE-TP:PIU, SE-TP:SPV, and TKZC:SPV;</li> <li>○ Institutional arrangements, roles and responsibilities of various agencies involved in SE-TP;</li> <li>○ Activities of the SE-TP:PIU, SE-TP:SPV and TKZC:SPV during the implementation phase and O&amp;M phase; and</li> <li>○ Strategies and policies for SE-TP development and operation.</li> </ul>
<p><b>Stage 19 - Project cost</b></p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Approach; <ul style="list-style-type: none"> <li>● SE-TP:PIU – scope and mode of execution;</li> <li>● The scope of TKZC:SPV and mode of execution;</li> <li>● The scope of other agencies; and</li> <li>● Specific exclusion from the scope of SE-TP:PIU and TKZC:SPV.</li> </ul> </li> <li>○ Computation of project cost; <ul style="list-style-type: none"> <li>● Cost of developing SE-TP common infrastructure including specialised tourism infrastructure;</li> </ul> </li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>• Cost of SE-TP connectivity and external infrastructure;</li> <li>• TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries;</li> </ul> <ul style="list-style-type: none"> <li>○ Phase-wise project and the development element-wise cost breakup including mode of development;</li> <li>○ Analysis of:           <ul style="list-style-type: none"> <li>• Funding through BEZA and implemented through SE-TP:PIU;</li> <li>• Funded through GoB and implemented by third-party respective government agencies; and</li> <li>• Investment by TKZC:SPV.</li> </ul> </li> </ul>
<p style="color: #800000;">Stage 20 - Branding and marketing strategies</p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Strategies for tourist attraction;</li> <li>○ Micro-level sub-sector wise project opportunities;</li> <li>○ Major marketing programs;</li> <li>○ Communication strategy including investor outreach program especially in the context of TAF and IRC-CoE&amp;IDC;</li> <li>○ Promotion concepts in identifying the developer/co-developer for TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries</li> <li>○ Marketing strategies for an anchor tenant in the context of IRC-CoE&amp;IDC;</li> <li>○ International roadshows; and</li> <li>○ Strategies for popularising SE-TP.</li> </ul>
<p style="color: #800000;">Stage 21 - Implementation schedule and micro level action plan for implementation</p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Implementation and monitoring mechanism;</li> <li>○ Activities wise time schedule for           <ul style="list-style-type: none"> <li>• SE-TP common infrastructure including specialised tourism infrastructure;</li> <li>• SE-TP connectivity and external infrastructure; and</li> </ul> </li> </ul>

Stage and micro-level activities
<ul style="list-style-type: none"> <li>• TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries;</li> </ul> <ul style="list-style-type: none"> <li>○ Micro-level action plan;</li> <li>○ Implementation plan and phasing;</li> <li>○ Statutory approval and linkages; and</li> <li>○ Inter agencies coordination activities and mechanism.</li> </ul>
<p style="color: #800000;">Stage 22 - Risks mitigation plan</p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ The approach towards risk management;</li> <li>○ Critical success factors;</li> <li>○ Multi-criteria analysis for risk management;</li> <li>○ Development of risk assessment matrix during implementation;</li> <li>○ Development of risk assessment matrix during operation;</li> <li>○ Risk assessment modelling and risk rating analysis;</li> <li>○ Analysis of risk based on classification: volume, value, cost, growth, governance and brand, customer, competitors and Political, Economic, Social, Technological, Environmental and Legal factors (PESTEL); and</li> <li>○ Description of risk, impact on business, causes, lead indicators, lag indicators, mitigation plan, residual risk, overall rating.</li> </ul>
<p style="color: #800000;">Stage 23 - Benefits and contribution</p> <p><b>Micro-level activities:</b></p> <ul style="list-style-type: none"> <li>○ Statement of the SE-TP overall objective;</li> <li>○ Benefits to rural communities, women, youth, marginalised society and poor, tourism value chain actors, knowledge industries etc.;</li> <li>○ Contribution to sustainable tourism value chain operations;</li> <li>○ Quantification of benefits from the economic, environmental and social perspective; and</li> <li>○ Contribution to UN SDGs.</li> </ul>

*Source: MACE analysis*

The Decision Support System (DSS) model was also deployed for the study, and task wise activities are presented in the **Annexure-2A**.

## Chapter - 3

# Tourism profile of Bangladesh, Cox's Bazar and its surrounding

### 3.1. Bangladesh tourism – an overview

Bangladesh is a country of natural beauty, hilly mountains, longest beach, favourable climate, six seasons which are the key factors to develop Eco-Tourism, sustainable tourism and rural tourism. Bangladesh has many archaeological and historical sites too. GoB is taking conscious efforts to make Bangladesh as one of the tourist destination countries in South Asia. The hospitality of people and local culture, lifestyle is a unique selling point. Tourism is a growing industry in Bangladesh. The tourism sector generated 125,000 international tourists in 2014, and international tourism generated US\$ 1.5 trillion in export earnings, and international tourist arrivals grew by 4.3% in 2014 to 1.133 billion. According to WTTC, direct employment support by travel and tourism is forecast to rise by 2.9 per cent per annum to 1,785,000 jobs or 1.9 per cent of total employment in 2023.

**Annexure-3A** present tourist arrivals, number of departures, international tourism expenditures and receipts and other tourism data pertinent to Bangladesh tourism.

### 3.2. Cox's Bazar - a major tourist attraction

Cox's Bazar sea beach is the longest beach in the world and is definitely one of the biggest tourist attractions in the country. Located in Chittagong District, this sea beach faces the amazing waves of grand Bay of Bengal. Miles of golden sands, towering cliffs, surfing waves, rare conch shells, colourful pagodas, Buddhist temples and tribes and mouth-watering sea-food made Cox's Bazar the tourist capital of Bangladesh.

Cox's Bazar used to be known as Bakoli in ancient times. Cox's Bazar sea beach is about 120 km long and is known to be the World's

second-largest unbroken clean sandy beach. The natural beauty of this region is unbinding and spectacular. Smooth carpet of silvery gold sand stretching to miles after miles, sloping effortlessly into the beautiful sparkling water of the Bay of Bengal, surfing waves, rare and colourful conch shells, towering and genteel cliffs, delicious seafood, different tribal communities, colourful pagodas and Buddhist temples are only a few words to describe the captivating splendour of Cox's Bazar.

The longest beach of Cox's Bazar has now been listed in the World's latest seven wonder's selection. For its undeniably beautiful nature, tribal culture, and several attractions, Cox's Bazar is one of the best tourist destinations in Bangladesh by all measures which is having splendid tourists' spots/potentials in the region. Sonadia Island is one among the tourist's potential in the vicinity of the Cox's Bazar. There are ample scope for expansion of beach tourism, cultural tourism, recreational tourism; city-based economic tourism and eco-tourism in the region. This is perhaps high time, if not late, to utilise the opportunities available for the development of the region through, planned development of tourism activities and expansion of related services & facilities.

There are several places in the region which are important in terms of tourism development. About 2 million tourists visit Cox's Bazar each year during the period of January–March, of which a very insignificant proportion is a foreign tourist. It seems that despite potentials, the region is not capable of attracting foreign tourists; and thereby cannot make an expected contribution to the national economy. The main problem seems to be unplanned growth with inadequate infrastructure and facilities for the tourists. It's a natural beauty, and economic

potentials have never been planned and used to make the life of local people prosperous. It is necessary to plan the region so that the potentials of the area can be tapped, and serious environmental hazards can be minimised.

The development of SE-TP with all necessary facilities and amenities for the tourists will resolve this issue and helps to enhance the prosperity of the region.

### 3.3. Regional setting

The SE-TP proposed at Sonadia Island falls under Kutubjom union of Maheshkhali Upazila in Cox's Bazar District which spreads in the North-West region of Cox's Bazar District and southernmost part of Upazila. The regional setting details of Sonadia Island is provided in **Exhibit No. 3.1**.

**Exhibit No. 3.1: Regional setting details of Sonadia Island**

Proposed study area	• 8967 acres
Division	• Chittagong
District	• Cox's Bazar
Upazila	• Maheshkhali
Union	• Kutubjom

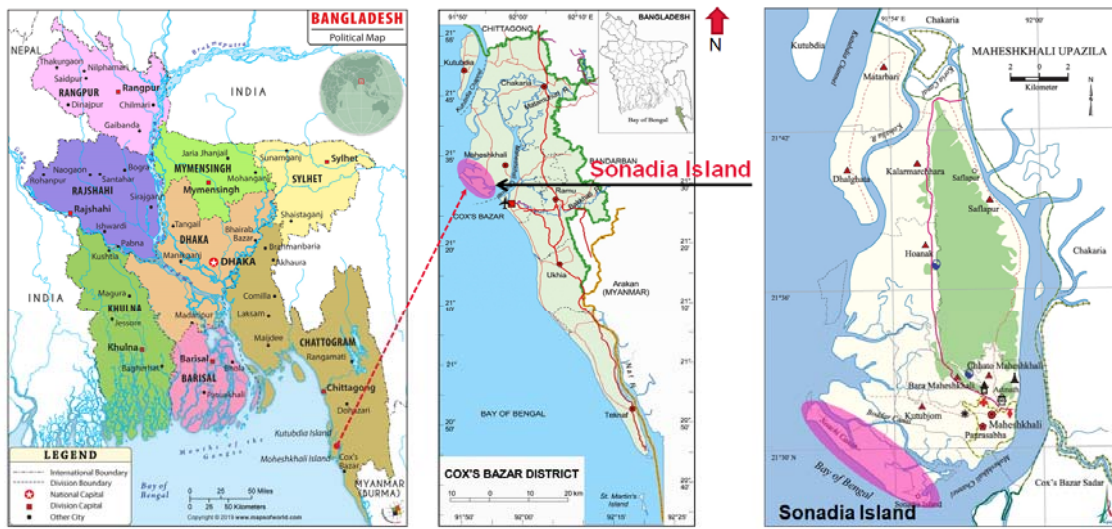
  

<b>8 Upazilas</b>	
• Cox's Bazar Sadar	• Kutubdia
• Maheshkhali	• Pekua
• Ramu	• Teknaf
• Ukhia	• Chakaria

Source: Statistical Handbook, 2016, Pg. No. 33

The regional setting map with administrative boundaries is depicted in **Exhibit No. 3.2**.

**Exhibit No. 3.2: Regional setting map of the proposed study area**



Source: <https://www.mapsofworld.com/bangladesh/bangladesh-political-map.html>

Source: [coxsbazar.gov.bd](http://coxsbazar.gov.bd)

Source: Banglapedia

This map is a generalized illustration only and is not intended to be used for reference purposes. The representation of political boundaries and the names of geographical features do not necessarily reflect the position of the Government of Bangladesh or Government of neighbouring countries on international issues of recognition, sovereignty, jurisdiction or nomenclature.

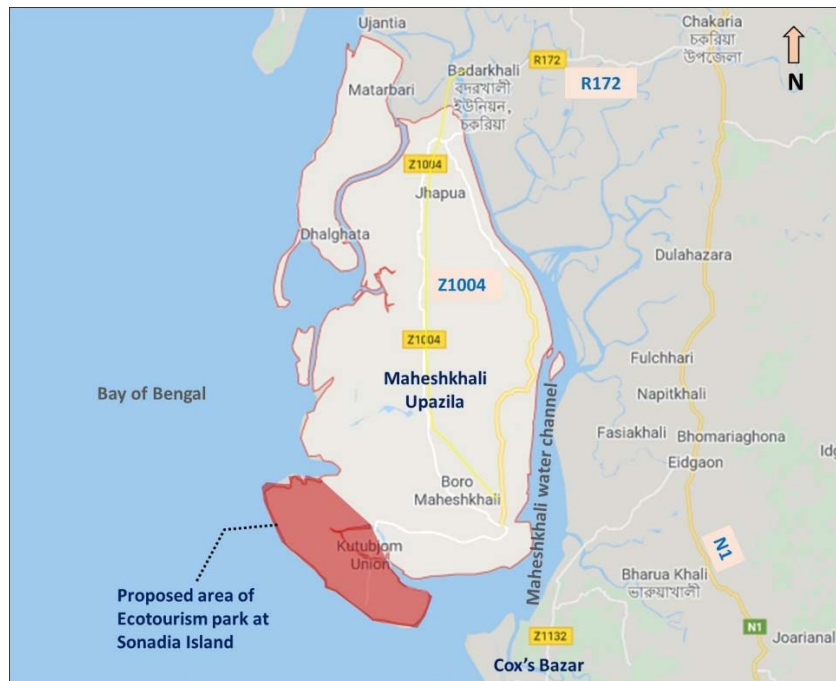
The Cox's Bazar District is dominantly known to be a potential tourist centre with a rich gift of nature within the southeast region of the country. The District resides on the coastal belt, which is bounded on the North by Chittagong District, on the East by Bandarban and Myanmar, on the South and West by the Bay of Bengal. It lies between 20°43' and 21°56' North latitudes and between 91°50' and 92°23' East longitudes. It is located 150 kilometres, South direction of Chittagong. The District consists of 8 Upazilas, 71 Unions, 177 Mouzas, 989 Villages, 4 Paurashavas, 39 wards and 164 mahallas. And it spreads over a total area of about 2,491.85 sq.km of which 940.58 sq.km is under forest.

In the national context, Cox's Bazar region is important for the natural attributes primarily including the sea beach and ranges of hills run parallel to the beach, which attracts millions of tourists every year. The nation can gain economically from the developed tourism

industry. There are port activities, which have already been developed under private sector initiatives. Several off-shore Islands reside in the Cox's Bazar District which is also prospective of tourism activities. The list includes Maheshkhali, Kutubdia, Matarbadi, Sonadia, Shah Pari and St. Martin or Jinjira as primary. The tourism potential of this District can attract tourists globally and nationally.

The proposed study area falls in Maheshkhali Upazila, which is depicted in **Exhibit No. 3.3**. The total area of the Upazila is 362.18 sq.km and is situated to the northwest of Cox's Bazar which is physically separated by Maheshkhali water channel connecting the Bay of Bengal. Maheshkhali Upazila is bounded by Pekua and Chakaria Upazilas on the North, the Bay of Bengal on the South, Maheshkhali water channel and Chakaria & Cox's Bazar Upazilas on the East and Bay of Bengal on the West.

**Exhibit No. 3.3: Location of the proposed study area in Maheshkhali Upazila**



*Source: MACE analysis*

The baseline information of the Upazilas of Cox's Bazar District is given in **Table No. 3.1**.

Table No. 3.1: Sub-District baseline information

Sub-District (Upazila)	Total area sq.km	Reserve forest sq.km	Riverine area sq.km	Union	Mouza	Village	River
Cox's Bazar Sadar	228.23	-	3.50	10	18	163	Bakkhali
Chakaria	643.46	136.25	40.47	20	66	335	No
Kutubdia	215.80	-	-	6	9	30	No
<b>Maheshkhali</b>	<b>362.18</b>	<b>-</b>	<b>112.38</b>	<b>9</b>	<b>31</b>	<b>170</b>	<b>Bakkhali and Maheshkhali channel</b>
Ramu	391.71	145.29	-	11	39	101	No
Teknaf	388.68	159.80	1.36	6	13	131	Naf
Ukhia	261.80	155.14	0.91	5	13	54	Naf
Pekua	139.68	2.25	2.02	7	11	63	No

Source: *Banglapedia (2014)* and Bangladesh Bureau of Statistics (BBS, 2011)

### 3.4. Demographic profile

As per BBS 2011, the total population of Cox's Bazar District is 2,289,990 out of which male population is 1,169,604 and female population is 1,120,386. The gender ratio is 958 (number of female per 1,000 males). The total number of households is 415,954, the literacy rate is 39.30%, and population density is 919 people/sq.km.

The three Paurashavas, namely Cox's Bazar, Maheshkhali and Teknaf, are designated as urban areas, and other areas have rural characteristics. As per BBS 2001, the urban population of Cox's Bazar District is 13.1%. The population details of Cox's Bazar District and Maheshkhali Upazila for the year 2001 and 2011 are shown in **Table No. 3.2**.

Table No. 3.2: Population details of Cox's Bazar District &amp; Maheshkhali Upazila - 2001 &amp; 2011

Name of District/Upazila	Administration control	Census population	
		2001	2011
Cox's Bazar	District (Zila)	17,73,709	22,89,990
Chakaria	Upazila	5,03,390	4,74,465
Cox's Bazar Sadar		3,48,075	4,59,082
Kutubdia		1,07,221	1,25,279
Maheshkhali		2,56,546	3,21,218
Pekua		-	1,71,538
Ramu		2,02,683	2,66,640
Teknaf		2,00,607	2,64,389
Ukhia		1,55,187	2,07,379

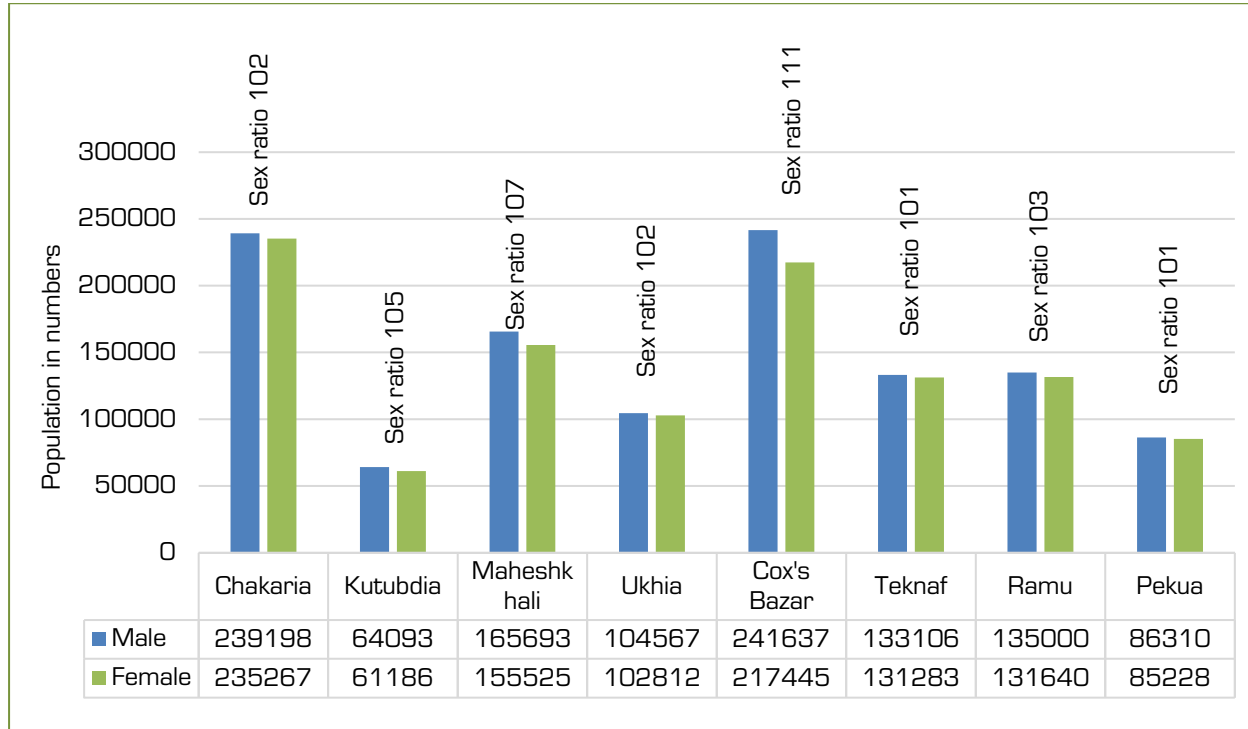
Source: *Population and housing census 2011- Cox's Bazar District*



From the above **Table No. 3.2**, it is found that the Maheshkhali Upazila stands 3<sup>rd</sup> rank next to Cox's Bazar Sadar Upazila in terms of population. This infers that the proposed project will have more beneficiaries.

The ratio of the male and female population in eight (8) Upazilas of Cox's Bazar is depicted in **Exhibit No. 3.4**.

**Exhibit No. 3.4: Sex ratio of Cox's Bazar District**



*Source: BBS - 2011*

### 3.5. Economic profile

The Cox's Bazar District economy is dominated by activities such as agriculture, fisheries and tourism. About 47% of people are involved in agricultural activities, 4.01% in fishing (Banglapedia) and remaining in tourism-based activities and service sectors. The region is a deficit in terms of rice, but the surplus in several agriculture products. The main exports of this region are betel leaf, betel nut, jackfruit, banana, papaya, pineapple, timber, shrimp, dry fish, salt, tobacco, groundnut, fish, coconut, shrimp fry and rubber. Moreover, Paddy, potato, pulse, onion, garlic, ginger, betel leaf, betel nut, wheat, sugarcane, groundnut, tobacco, rubber and vegetables are the main products of the agriculture sector. In terms of fishing, the area is rich, and there are 1458 fish farms, 759 shrimp farms, 49 livestock, 246 poultries, 47 hatcheries

and 6 fish nurseries in Cox's Bazar District. Besides, a substantial proportion of the people are engaged in service sector activities. Especially, the tourism sector in the region is remarkable for economic gains, both regionally as well as nationally.

### 3.6. Tourism profile

Bangladesh is a country of natural beauty, hilly mountains, longest beach, favourable climate, six seasons which are the key factors in developing eco-tourism, sustainable tourism and rural tourism. Bangladesh has many archaeological and historical sites and the hospitality of the people, local culture and lifestyle are a unique selling point. Tourism is a growing industry in Bangladesh with a lot of tourism-based potentials which are discussed in the subsequent section.

### 3.6.1. Tourist spots/potentials of Cox's Bazar

The beach town of Cox's Bazar, the Country's one of the hottest tourist spot. Tourism is the largest and fastest-growing industry in Cox's Bazar. The tourist spots are scattered throughout the region, and the tourist town has been witnessing an increased flow of tourists from different parts of the country.

The major tourist spots within the Cox's Bazar District are Cox's Bazar beach (world's longest beach of 111 km length) near Sonadia Island, Saint Martin Island at 95 km from Cox's Bazar, Inani beach at 22 km from Cox's Bazar, Himachori beach and waterfall at 12 km from Cox's Bazar and Maheshkhali Island at 82 km from Cox's Bazar.

Saint Martin Island, a coral Island, is about 10 km Southwest of the Southern tip of the mainland is a tropical cliché, with beaches fringed with coconut palms and bountiful marine life. This Island has the most amazing blue water. This amazing Island is so small that it is possible to walk around the entire Island. Inani beach is only

half an hour's drive from Cox's Bazar. With the sea to the West and a background of steep hills to the east, this beach will mesmerise with its amazing view.

To build Cox's Bazar region as a significant tourist zone with several natural hubs, Sonadia Island can be considered as a major spot, since it holds splendid natural features. There are water channels running through the Island decorated with different types of plants, mangroves and weeds along the sides. Its Western coast is sandy and is rich in various kinds of seashells. At the northern part of the Island, there are beds of windowpane oysters. This Island holds a lot of tourist-attracting components and is divided into two neighbourhoods East-Para and West Para. More than 2,000 people are living in Sonadia Island. Most of the people reside on the Eastern side, and the main occupation of the Islanders are catching fish, collection of shrimps, making dry fishes and minnow etc.,

The existing tourism spots in Cox's Bazar District are tabulated in **Table No. 3.3**.

**Table No. 3.3: Tourist spots in Cox's Bazar District**

Cox's Bazar	Ramu	Chakaria	Teknaf	Ukhia	Maheshkhali	Kutubdia	Pekua
Longest Sea Beach	Ramkot Hindu Mandir	Tomb of Shah Umar	St. Martin's Island	Patabari Buddhist Keyang	Adinath Temple	Kalarna Masjid	Mangrove Forest
Agvamedha Buddhist Keyang	Ramkot Buddhist Keyang	Satgumbad Masjid of Fazl Quke at Manikpur (1873)	Well of Mathin	Inani Beach	Maheshkhali channel	Tomb of Qutub Awliya	Hill Forest
Himchari National Park	Lamarpara Buddhist Keyang	Hasher Dighi	Naf River	Kutupalang Buddhist Keyang	Sonadia Island	Lighthouse /Batighar	
Single domes mosque at Jhilanga	Namarpara Buddhist Mandir	Dolhazara Safari Park	Jaliyar Island	Kana Bazar underground channel	Battle leaf	Malekh Shah Oyaliya Mazar	
Buddhist Pagoda	Marmaid	Chawarfari Mangrove Forest	Shaporir Island	Rajapalong Tourist Camp	Digital Island	Sea Beach	
Nazirar Teak	Hill forest		Sabrungr Park	Crocodile firm	Rakhayin Mandir		
Rakhayan Palli			Sea beach	Tulip	Sea beach		
Fish Aquarium			Hill forest	Rohingyas Refugee Camp	Hill forest		
Cox's Carnival				Hill Forest			

Cox's Bazar	Ramu	Chakaria	Teknaf	Ukhia	Maheshkhali	Kutubdia	Pekua
Hill forest							
Marine drive							
Eidgah Bazar							

*Source: CoxDA*

The tourism potential of Sonadia Island, analysis of domestic and international tourist's footfall data, tourist's projection/arrival of

expected tourists to SE-TP with related assumptions and tourists survey outcomes are elaborated in a separate chapter.

## Chapter – 4

# Conceptualisation and configuration of SE-TP including IRC-CoE&IDC

### 4.1. Need for the project

The business volume of tourism equals or even surpasses that of oil exports, food products or automobiles. Tourism has become one of the major players in international commerce and represents, at the same time, one of the main income sources for many developing countries. This growth goes hand in hand with an increasing diversification and competition among destinations. Innovation has become a necessity in today's business, and it is the quintessential key to the sustainable development of the tourism sector. Tourism is considered as a major activity supporting an economic sector that is responsible for 9% of global GDP. Tourism has seen significant growth in recent years, which is forecast to continue, especially in developing countries which have seen a rate of increase in visitor arrivals that considerably exceeds the world average. Tourism accounts for 29% of

exports in services worldwide and for many developing countries it provides a significant, and sometimes the primary, source of foreign exchange earnings. The contribution of the tourism sector to economic growth is confirmed through several studies in the past. Further, many international bodies, conventions and communications have formally recognised the importance of the tourism sector as a driver of sustainable development. The new Rio+20 outcome document "The Future We Want" includes sustainable tourism as contributing to green growth. The global spread of tourism in industrialised and developed states has produced economic and employment benefits in many related sectors - from construction to agriculture or telecommunications (UNWTO).

While tourism is a major force for development, **Exhibit No. 4.1** explains the negative aspects.

**Exhibit No. 4.1: Constraints in the tourism sector**





*Source: UNWTO analysis*

A fundamental requirement of the tourism sector is that it should embrace the principles of sustainable tourism and focus on the achievement of SDGs. The sustainability in tourism involves holistic and interdisciplinary approach encompassing sustainable management of resources, enhanced business sustenance, ensuring sustained interest of tourist, continued up-gradation of facilities, socioeconomic impacts, cultural impacts, environmental impacts (including responsible consumption of resources, reducing pollution, and conserving biodiversity and landscapes) and compliance to the relevant UN-SDGs.

The UNWTO has defined sustainable tourism as “tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities”. As per UNWTO, sustainable tourism should:

1. Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity;

2. Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance; and
3. Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation;

The sustainable tourism interventions indicate that one of the effective and proven approaches to address the tourism sector challenges is to promote large-scale Eco-Tourism cluster. An Eco-Tourism cluster will be a concentration of leisure, entertainment, education, skill development and allied activities, interconnected with each other, building value and networks, addressing common challenges and pursuing common opportunities.

Bangladesh endowed with bounteous natural advantages offers immense opportunities for high growth in tourism and allied sectors. It is imperative to take and develop strategies to leverage the growing demand in both domestic and international tourism markets, besides

fulfilling its employment and rural development objectives and conservation of the environment. Based on the findings, the thrust areas requiring priority attention would include:

- Improving tourist destinations;
- The attraction of domestic and international tourist;
- Providing whole family engagement;
- A seamless blending of leisure, entertainment, education, skill development and allied activities;
- Enlarging tourist product offerings;
- Promotion of agro and rural tourism;
- Protection of tourist destination;
- Promoting responsible and sustainable tourism;
- Use of smart and ICT applications in the tourism sector;
- Conservation and protection of biodiversity; and
- Preserve cultural values and national pride.

The above interventions would be able to address the challenges impeding the tourism sector and drive growth.

The decision to establish the IRC-CoE&IDC at Sonadia Island is an expression of the ambition to derive all the benefits that engineering R&D, consulting and knowledge services can bestow on the companies, GoB, people and the environment. There are a wide variety of areas of direct relevance to social development in Bangladesh, that include: suitable project design and implementation to enable funds to search for projects and projects to deliver sustainable solutions, creation of industry-academia networks to address the need to reduce unlearning time of candidates when they join the consulting profession and create a sound ecosystem for informed, confident decision making for all stakeholders. The proposed IRC-CoE&IDC shall give special attention to these problems through appropriately designed and executed R&D programmes.

## 4.2. Eco-Tourism cluster concept

Sustainable tourism should not be regarded as a separate component of tourism, as a set of niche products, but rather as a condition of the tourism sector as a whole, which should work to become more sustainable. Sustainable development of the tourism and allied sectors is essential for achieving desired objectives such as economic growth, foreign exchange earnings, creating jobs for millions of teeming youth and women, sustainable rural development, creating value chains where Bangladesh has comparative advantages, attracting FDI, supporting the development of tourism sector, human resource development and establishment of standards for safety and security of visitors and changing the perception about tourism as a holistic initiative instead of mere entertainment developmental project.

It is a well-established fact that availability and access to infrastructure is a pre-requisite for attracting inward investments to the country and the concept of Eco-Tourism cluster development would aid in attracting investments by addressing the infrastructure bottlenecks. Many such international Eco-Tourism clusters/zones have successfully transformed the profile of the region beyond imagination.

As per the International Eco-Tourism Society, Eco-Tourism can be defined as 'responsible travel to natural areas that conserves the environment and improves the well-being of local people'. It's travelling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations (both past and present) found in these areas. (Ceballos-Lascurain, 1987).

David A. Fennell in 1999 defines Eco-Tourism as "A sustainable form of natural resource-based tourism that focuses primarily on experiencing and learning about nature, and which is ethically managed to be low-impact, non-consumptive, and locally-oriented (control, benefits, and scale). It typically occurs in natural areas and should contribute to the conservation or preservation of such areas."

Clusters, internationally recognised as an effective means of promotion of value addition in the tourism industry, offer a successful tool of intervention for policymakers. Well-functioning clusters not only improve the competitiveness of the member enterprises but also contribute towards the generation of employment and alleviation of poverty in the region.

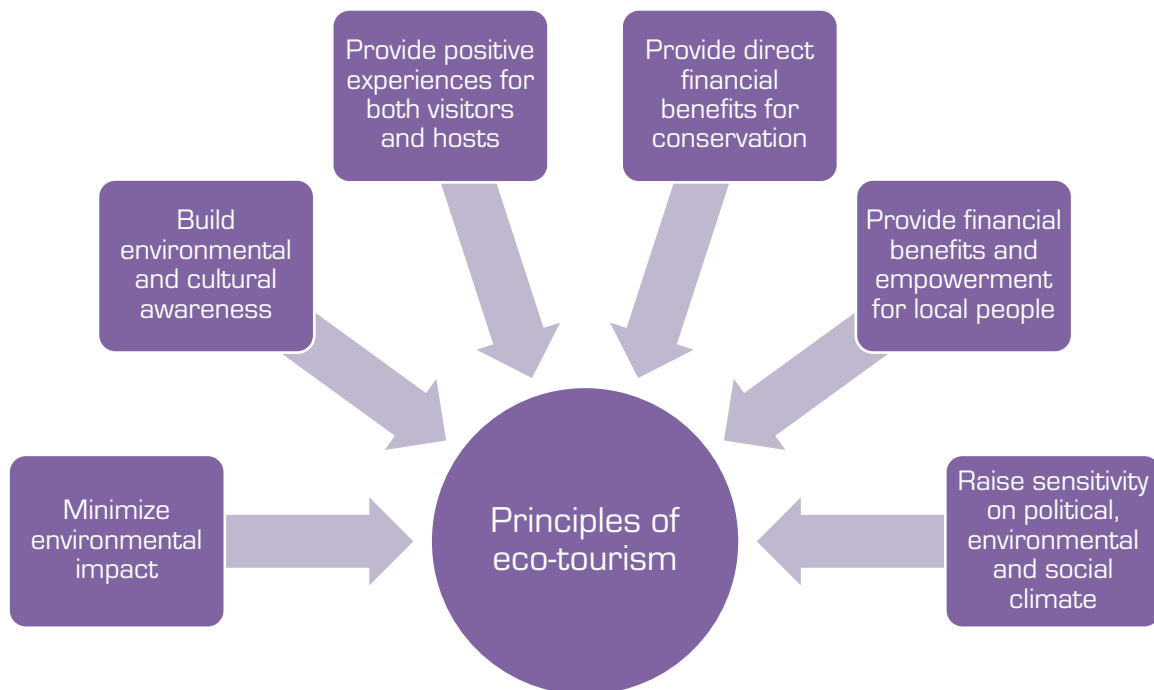
The economy of scale is an important feature in cluster operation. Besides sharing common technical infrastructure in a cluster environment, that many SME may not be able to afford individually, many tourism clusters can have common facility centres for assisting the tourism value chain actors in enhancing their reach and complying with international standards and government regulations. Symbiotic collaboration between tourism product offeror and tourist yields financial and environmental benefits through the exchange of complementary resources. The various entities/companies operating in tourism clusters can also share utilities such as energy, water, and wastewater treatment, and services such as transportation, landscaping, and waste collection. Further, in the

cluster approach, there can be the ready availability of tourism development services such as sustainable business volumes, accessing technology, aggregating common purchases, linking up with planners and designers, and for facilitating subcontracting, training and connecting with research and development (R&D) organisations.

Eco-Tourism cluster can be set up to promote the formation of linkages in all directions. Tourist operators, travel agencies, suppliers of raw materials, services, and finance constitute backward linkages; the visitors constitute forward linkages; other enterprises with common inputs, complementary products or related skills or technologies constitute lateral linkages. Each Eco-Tourism cluster develops according to its model with its specific linkages.

A tourism cluster entitles for classification as an Eco-Tourism cluster if the communities of businesses cooperate with each other, sharing resources while conserving the bio-diversity and promote the principles of Eco-Tourism as depicted in [Exhibit No. 4.2](#).

Exhibit No. 4.2: Principles of Eco-Tourism



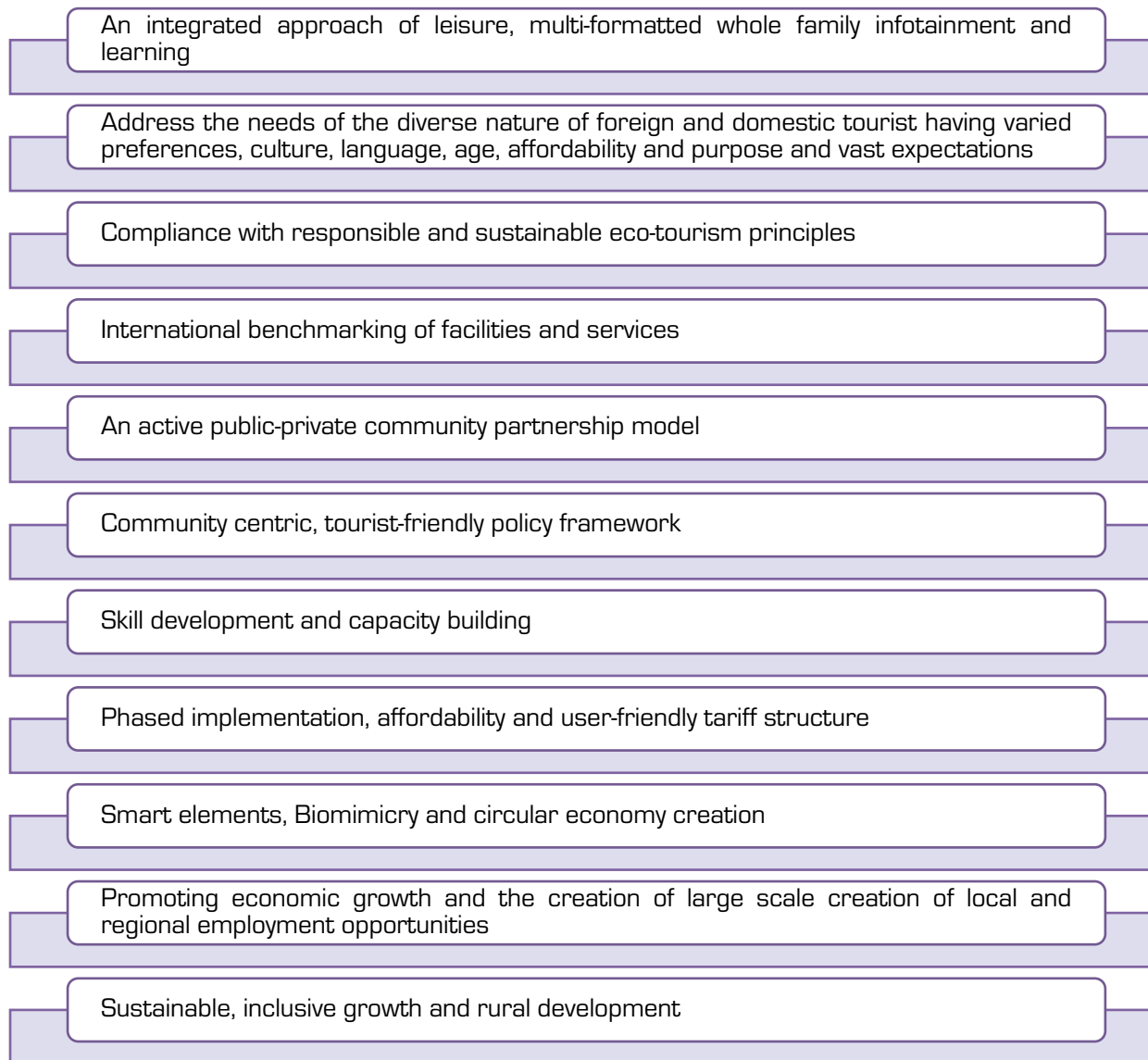
*Source: MACE analysis*

On an extended concept, Eco-Tourism includes tourism that is community-based and community-driven. The aim should be moving towards a system of tourism around protected areas which is primarily community-based tourism. So, the proposal shall be balanced impact, educational, and conserves the ecology and environment of Sonadia Island, while directly

benefiting the economic development of local communities.

The founded on the principles of eco-conservation, innovation, sustainability, and social inclusion, the main driving pillars of SE-TP is depicted in **Exhibit No. 4.3**.

**Exhibit No. 4.3: Main driving pillars of SE-TP**



**Source:** MACE analysis

This type of tourism clusters can receive their denomination of Eco-Tourism cluster because of different reasons, related to sharing

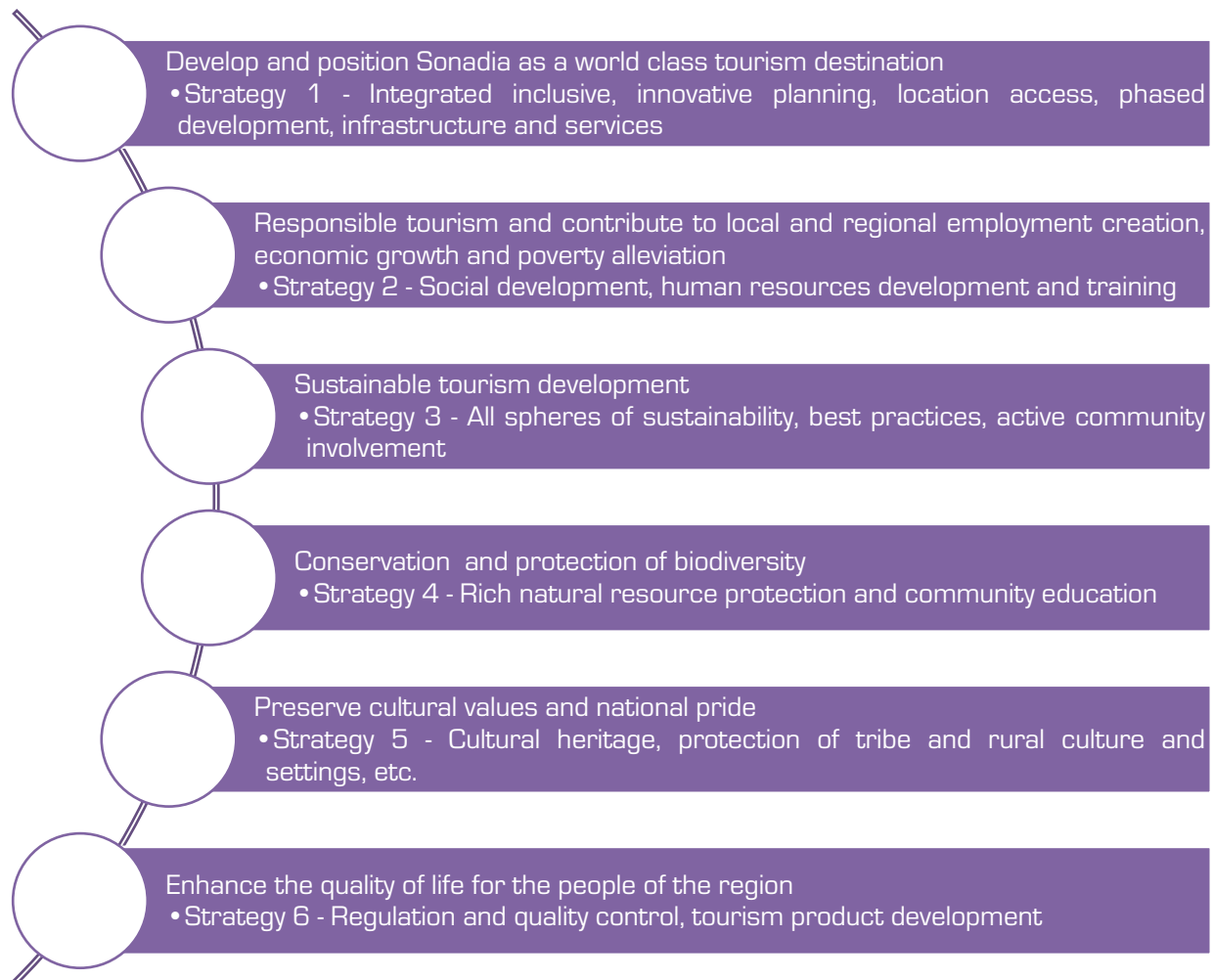
materials, energy, or infrastructure besides preserving cultural values and national pride, conservation and protection of biodiversity. It is



also possible to develop green infrastructure or foster scavenger companies in the Eco-Tourism clusters, which strengthens the fact that cluster members constitute one possible aspect of Eco-Tourism clusters. The tourist value chain actors do not accomplish the goals of environmental sustainability in isolation. The networks of social, professional and exchange relationships embed the organisation with other organisational actors. The most accepted definition of an Eco-Tourism cluster proposes a community of tourism sector players located together on common property. These tourism sector players seek enhanced environmental, economic and social performance through collaboration in managing environmental and resource issues.

The founding principles of sustainable tourism and strategies involved while conceptualisation SE-TP is depicted in **Exhibit No. 4.4**. SE-TP shall focus on creating an enabling institutional structure for addressing the thrust areas, facilitating technologies, skill sets and modern management practices. Special emphasis also includes facilitating state-of-the-art technology, know-how and avenues for attracting foreign tourist apart from infusing investments on a transparent mode to develop the much-needed tourism infrastructure and promoting infotainment model of development.

#### Exhibit No. 4.4: Holistic approach for sustainable tourism

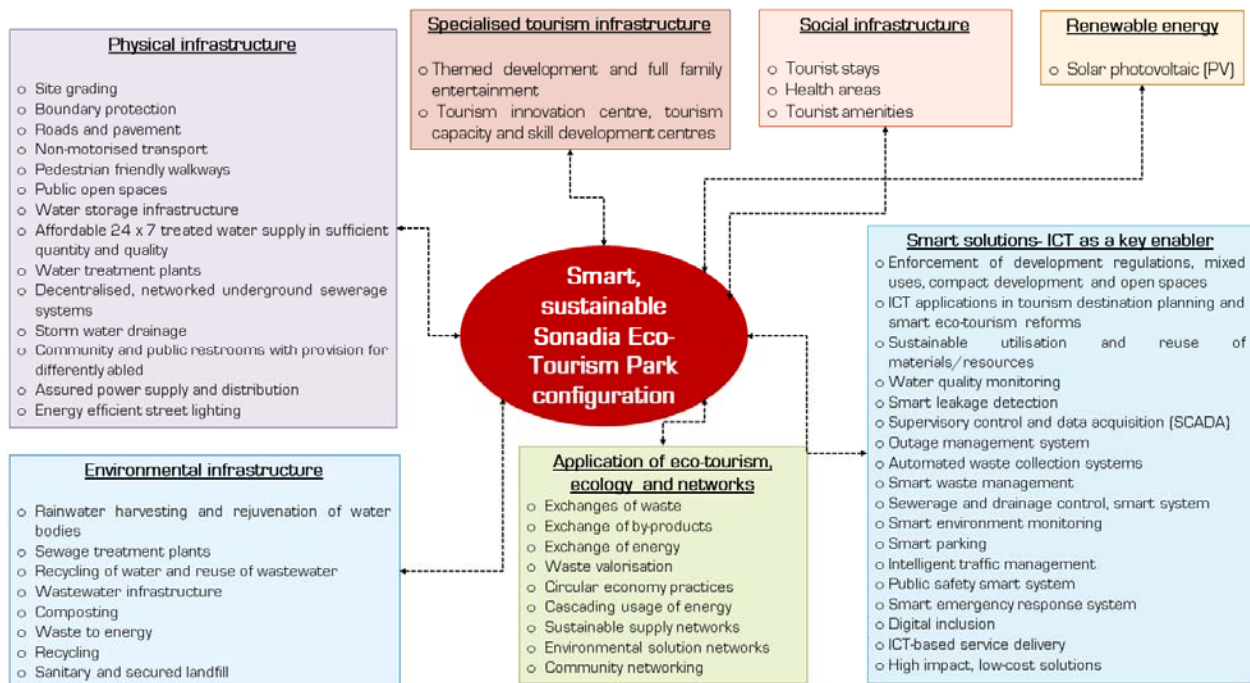


*Source: MACE analysis*

SE-TP development aims at achieving balanced development by sustainably leveraging the opportunities, harnessing the skill sets of the region, ably supported by competitive tourism specific infrastructure coupled with environmental, physical and social infrastructure.

The State-of-the-art smart, sustainable SE-TP shall be established in terms of both hard infrastructure and human dimension interventions as depicted in **Exhibit No. 4.5**. Apart from promoting sustainable tourism, SE-TP shall have the privilege of touching the lives of people and the community by participating in socially inclusive initiatives.

**Exhibit No. 4.5: State-of-the-art smart, sustainable SE-TP**



*Source: MACE analysis*

The development of SE-TP, including IRC-CoE&IDC, would yield the desired results regarding the economic and social development of not only the region but also the country.

SE-TP will also participate in any wider regional innovation system where benefits can accrue through the collaboration between local innovation and incubated ventures.

The IRC-CoE&IDC within SE-TP shall be positioned as an integrated research centre that combines basic and applied research with engineering to accelerate scientific discovery in critical issue areas. SE-TP and IRC-CoE&IDC shall be positioned as an integrated infotainment hub/centre of excellence and shall work with regional research partners, companies and entrepreneurs to facilitate and undertake commercialisation and incubation activities for achieving safe, climate-resilient and prosperous Eco-Tourism, knowledge, innovation-based green and blue economy.

SE-TP and IRC-CoE&IDC will act as a platform to facilitate this engagement and collaboration with domain experts, stakeholders, key participants and shall lead the innovation movement in the field of tourism and knowledge-based green economy.

IRC-CoE&IDC is considered as a community of successful innovative companies, whose main aim is to increase the wealth of its community by promoting a culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.

Leveraging the tourism ecosystem, SE-TP is a perfect blend of research, education, leisure and entertainment.

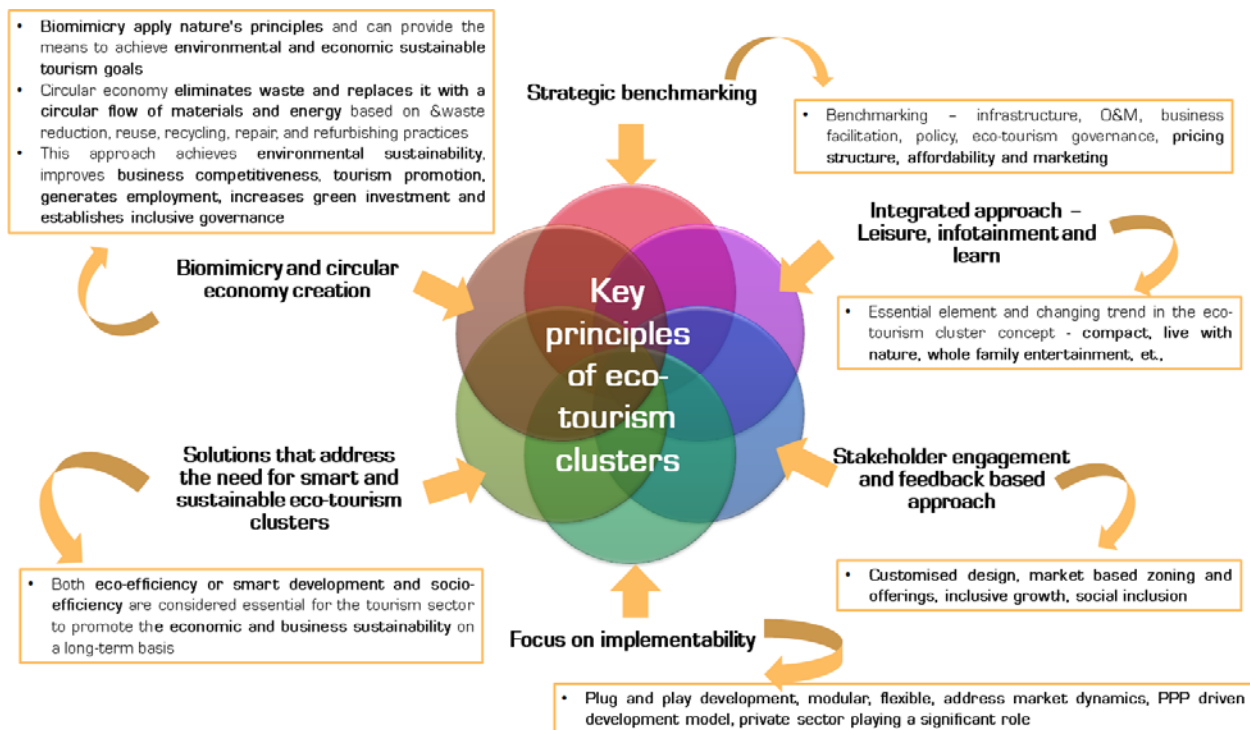
SE-TP shall also aim to herald a mindset change at the grassroots level so that more and more people in education, business, government, Non-Governmental Organisations (NGOs), urban and rural development engaged in innovative

activities, are co-opted and participate in shaping the innovation strategy at the national level.

SE-TP shall always endeavour to direct and streamline all its efforts to establish unparalleled identity and create a niche not only at the project level but for the entire tourism sector.

Exhibit No. 4.6 shows the key principles of developing MP & DP.

Exhibit No. 4.6: Key principles of SE-TP with an underlay of private sector involvement



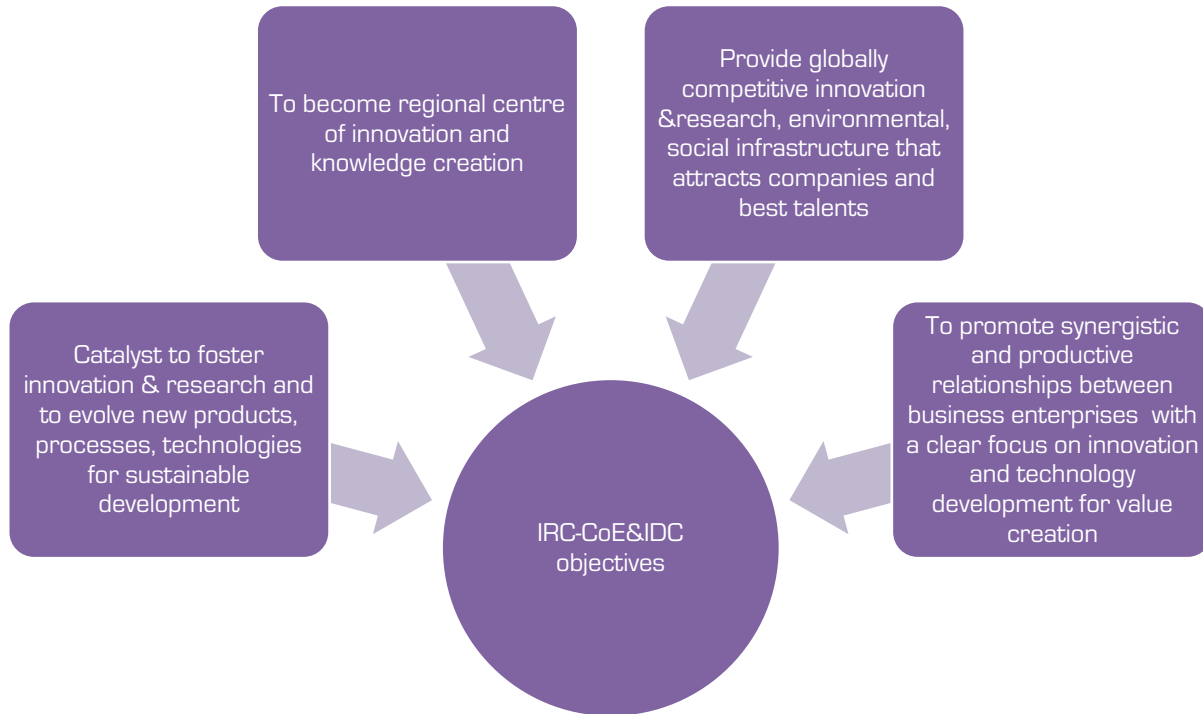
Source: MACE analysis

Thus, the SE-TP provide full family infotainment model and provide opportunity across the tourism value chain. SE-TP shall demonstrate its capability in accepting no limits in developing Bangladesh tourism markets through alternative thinking, best suiting to the

requirements, setting its standards, benchmark and templates besides driving positive change.

#### 4.3. Focus of IRC-CoE&IDC

The objectives of development of IRC-CoE&IDC is depicted in Exhibit No. 4.7.



*Source: MACE analysis*

The focus of the IRC-CoE&IDC is on innovation and technology-led businesses that enhance Bangladesh competitive advantage and align with the economic, industrialisation, and knowledge development strategy, particularly in areas such as life sciences, alternative & renewable energy, environment technologies & sustainable business practices, advanced materials and innovative products, built environment and sustainable communities. Bangladesh is well-positioned to contribute to global engineering research and development as the ecosystem of captive centres, service providers and start-ups, increasingly work together to drive innovation and IRC-CoE&IDC shall leverage this conducive environment. Thus the proposed IRC-CoE&IDC would become a major magnet for attracting domestic and international companies in the identified segments for establishing their businesses, thereby creating employment opportunities and economic growth in Bangladesh. Furthermore, IRC-CoE&IDC is expected to provide a conducive environment for attracting international class educational universities and colleges, research & development institutions and knowledge workers

industries with all supporting facilities as a feeder to the occupant units.

#### 4.4. Strategies for the sustenance of the Eco-Tourism cluster

International benchmarking of product and expertise in the creation of seamless integration of leisure, entertainment, education, skill development and allied activities, plug-n-play infrastructure, cost-effective delivery, the right blend of whole family infotainment and focused marketing are some of the key drivers for the success of Eco-Tourism cluster.

The comprehensive planning, development, O&M guidance on key issues such as disaster response and management, safety and hygiene practices, safety and security of tourist, effective linkages between tourism value chain operators and tourist, country partnerships, backward and forward linkages are all key factors in the development strategy. Further, general infrastructure, specialised tourism infrastructure, project structuring, financing, connecting with market needs, research priorities, industry-

academia relationship, strategic linkages also form important elements in the development strategy. Environmental sustainability, phytosanitary and hygienic considerations, food safety standards, etc., are also key considerations when drafting the development strategy. SE-TP is fundamentally a people-based activity covering employment, decent work and human capital and hence appropriate measures include careful planning of human resources, involving

consultation with private enterprises and employee representatives, is needed to ensure that SE-TP can fulfil its employment creation potential and has a sufficient supply of suitably skilled labour to meet future growth.

**Exhibit No. 4.8** provides globally competitive strategies for positioning SE-TP as a preferred investment destination for the tourism sector, innovation and R&D hub.

#### Exhibit No. 4.8: Strategies for the sustenance of the Eco-Tourism cluster, innovation and R&D hub



**Source:** MACE analysis

#### 4.5. Objective enablers of SE-TP including IRC-CoE&IDC

Sustainable tourism like SE-TP development takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities. Poverty reduction, social inclusion and creation of

large-scale employment through SE-TP requires commitment from GoB and the private sector with relevant policies and tools, such as value chain analysis, to determine which interventions can best take place to support poor communities. **Exhibit No. 4.9** provides the well-devised enablers for achieving the objectives of SE-TP, including IRC-CoE&IDC.

- **Sustainable eco-tourism cluster:**
  - Create a vibrant large size Eco-Tourism cluster with an efficient and effective business environment
  - Establish a premier world-class tourism hub, internationally renowned for its multi-formatted product offering and creative energy – a preferred destination for domestic and foreign tourist as well as national /international companies for partnering and networking
  - Delivering innovative solutions and nurturing skills to meet the needs of a fast-changing world
  - Focused development and attain leadership on a global platform in providing sustainable tourism
  - Better utilisation and value-addition of rural arts and crafts products
  - Create world-class multi-formatted whole family infotainment across culture, age, preference and vast expectations, with excellent state-of-the-art infrastructure facilities
  - Induction of modern technology and smart applications for enhancing the tourist experience
  - Provide an intellectually stimulating environment through which professionals from academia, industry, incubators and research laboratories can collaborate on projects of business, government, societal, commercial and national significance
  - Produce professionals in different sectors with different skills, who will be capable of innovating, creating and harnessing both local and global best practices for solving problems of local and national interest in the arena of knowledge, green and blue economy besides addressing the needs of the tourism sector
  - Providing policy support, promotional initiatives and facilities to promote sustainable tourism sector development
- **Innovation and research hub for a knowledge-based green economy:**
  - Create a vibrant campus with traditional values for efficient and effective learning and research environment
  - Establish a premier world-class innovation hub, internationally renowned for its intellectual capital and creative energy – preferred home to domestic /international companies for partnering and networking
  - Delivering innovative programmes and develop skills to meet the fast-changing world
  - Focused development and attain leadership on a global platform in the identified segments
  - Holistic approach for learning and personality development and emerge as leading innovation hub
  - Provide an intellectually stimulating environment through which scientists and technologists from academia and research laboratories can collaborate on projects of scientific, societal, commercial and national significance
  - Produce scientists, researchers and technologists in cutting edge areas, who will be capable of innovating, creating and harnessing both local and global technologies for solving problems of local and national interest and improving the quality of life of people
  - Create live and vibrant links with industry, academia and researchers nationally and globally through dynamic knowledge networks
  - Encouraging R&D in emerging areas

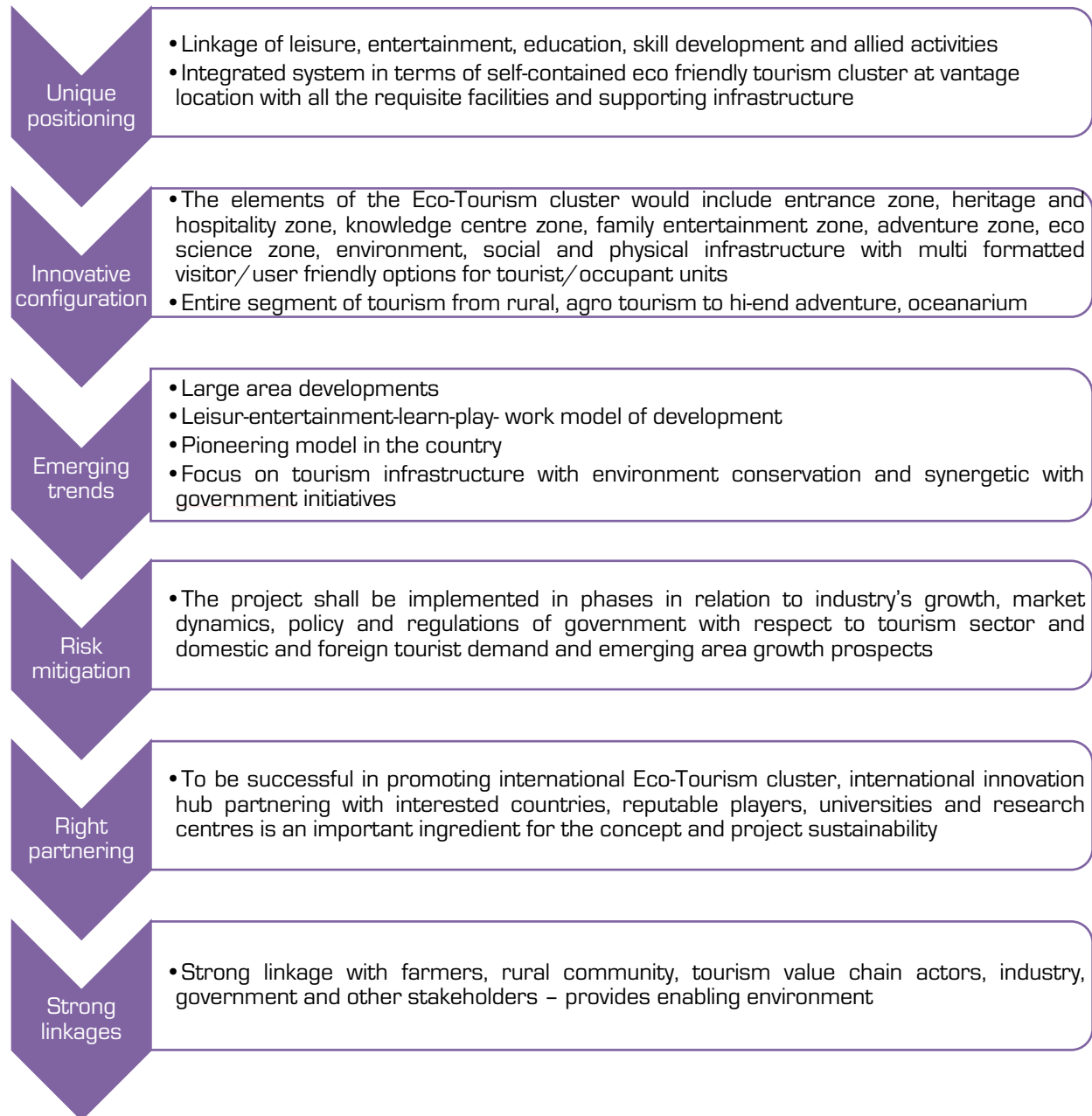
*Source: MACE analysis*

#### 4.6. Product differentiators

Exhibit No. 4.10 highlights the project conceptualisation and product differentiation created through innovation and positioning. Well strategised eco-tourism sector, linkages between

various tourism value chain actors, strong infrastructure and a unique interdisciplinary environment are expected to contribute towards the goal of achieving the growth of the tourism sector.

Exhibit No. 4.10: Product differentiators



*Source: MACE analysis*

With an investment outlay spread over the next 30 years, the SE-TP shall trigger economic growth, rural development, create large scale local and regional employment opportunities and promote inclusive growth. The SE-TP shall set a new paradigm for sustainable tourism development and shall effectively address the major constraints to tourism.

SE-TP ensures a substantial increase in the investments aimed at streamlining tourism value chain by attracting state-of-the-art technology and by encouraging best practices in every aspect of tourism, all of which will help in reducing the unnecessary transaction costs of the visitors and substantially improve realisation for the rural community, while still affordable especially to the domestic tourist.

The state-of-the-art facilities in the SE-TP shall provide a conducive business environment for knowledge workers, research and innovation

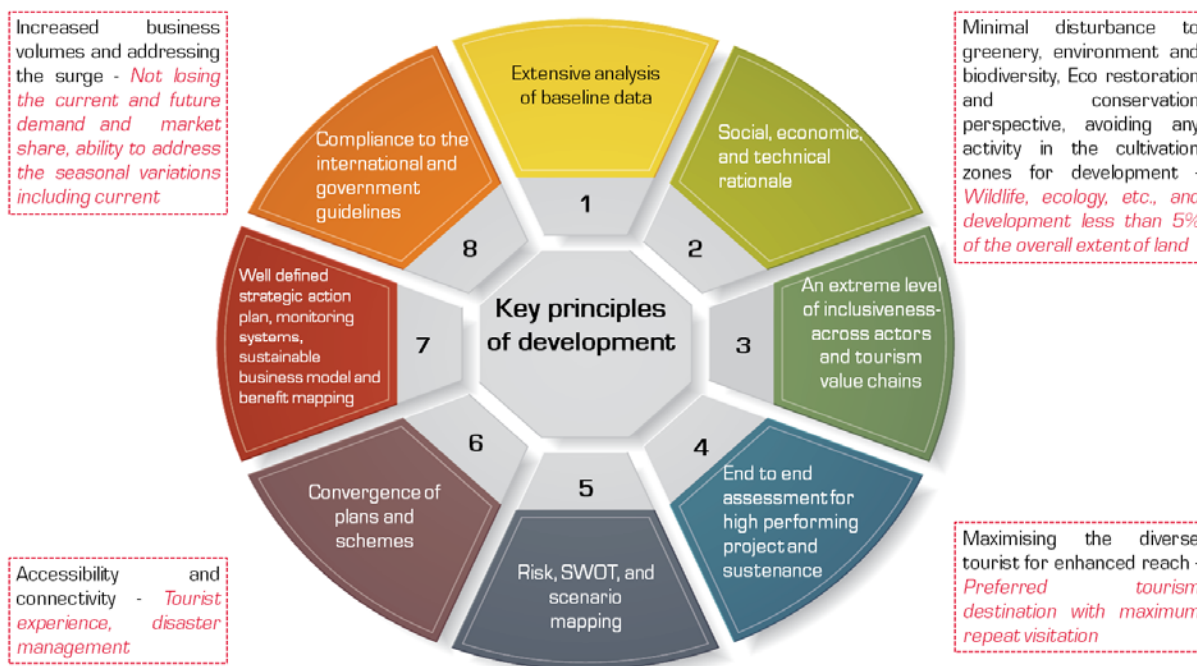
activities promoting a green knowledge-based economy.

SE-TP would essentially be a confluence of enabling zones, the development of which would supplement and complement the core objectives of the development process. The enabling zones would cover a horizon of activities fundamentally of importance to propel the conceived development of tourism and allied sectors in the country.

SE-TP is planned to evolve into a world-class infotainment environment characterised by professional and modern estate management, meticulous institutional systems, transparent guidelines and rules, the efficiency of services and discipline with the affordable price structure to the visiting population.

Compared to traditional approach, SE-TP development encompass several unique elements as detailed in **Exhibit No. 4.11**.

**Exhibit No. 4.11: Innovative approach of SE-TP development in contrast to the traditional model**



Source: MACE analysis

The facilities proposed in SE-TP are fully secured and provide the required level of control on the data and information protection. The occupant units, especially in IRC-CoE&IDC, shall

have access to intellectual resources, high quality specialised and specific infrastructure facilities (wet and dry labs, pilot-scale facilities), highly specialised equipment, shared resources,



business incubation space and a variety of technical, entrepreneurial and commercialisation services. The occupant units, especially engaged in knowledge-based activities, can enjoy multi-formatted space agreements – long-term leasehold, short-term lease, and monthly lease.

The domestic companies engaged in the knowledge sector lookout to have access to the latest technology from the technologically advanced countries as well as to the marketing support in the foreign markets. Domestic researchers need to collaborate with quality researchers from technologically advanced countries as such shared experiences often lead to the adoption of best practices. SE-TP, therefore, can play a significant role in this segment also by collaborating with reputable university/research organisations.

Well-conceived tourist-centric concepts and strategies are incorporated to position SE-TP as a world-class tourism destination while conserving and protecting biodiversity, cultural values and national pride. Sustainable tourism is firmly positioned in the 2030 agenda of sustainable development. SE-TP has the potential to contribute, directly or indirectly, to all of the sustainable development goals (SDGs). In particular, SE-TP is of direct relevance to targets in Goals 8, 12 and 14 on inclusive and sustainable economic growth, sustainable consumption and production (SCP) and the sustainable use of oceans and marine resources, respectively. Achieving this agenda, however, requires a clear implementation framework, adequate financing and investment in technology, infrastructure and human resources. Harnessing SE-TP benefits will be an important action for achieving the SDGs of Bangladesh.

## Chapter - 5

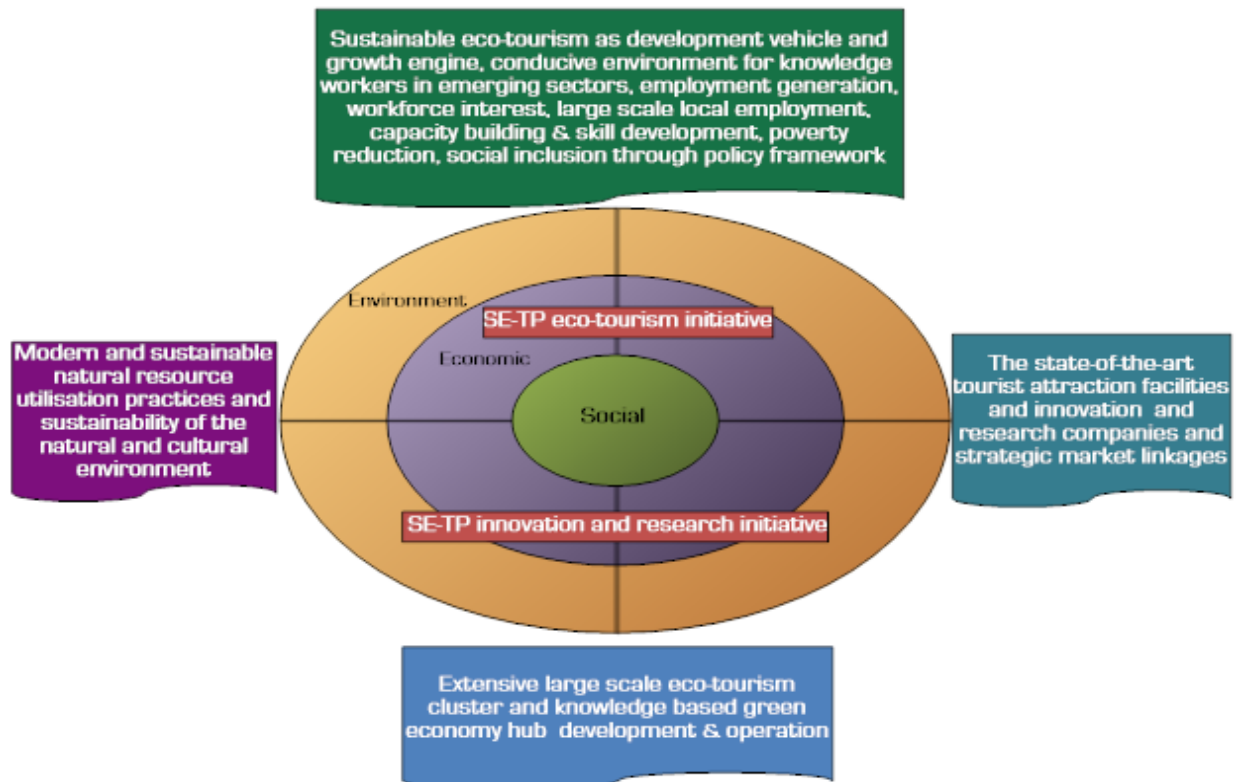
# Vision and mission of SE-TP including IRC-CoE&IDC

### 5.1. Development approach

The development strategy includes efforts in increasing tourism and knowledge-based green economy through the concept of sustainable eco-tourism, optimised resource utilisation, preserving the natural eco-system, enhancing the innovation & research eco-system, building domestic capabilities and reaching high-end markets besides fulfilling domestic requirements through import substitution and "Make in Bangladesh" driven approach. The project shall address the needs of domestic

tourist requirements and lure foreign tourist primarily through its natural assets and biodiversity conservation. **Exhibit No. 5.1** depicts the strategic linkage between the gap, intervention and the framework. The study involves evolving an integrated end-to-end approach to the concept of inclusive, sustainable eco-tourism and knowledge-based green economy development and triple bottom line approach to ensuring environment, economic and social sustainability besides protecting cultural and traditional values.

Exhibit No. 5.1: Inclusive, sustainable eco-tourism and knowledge-based green economy development

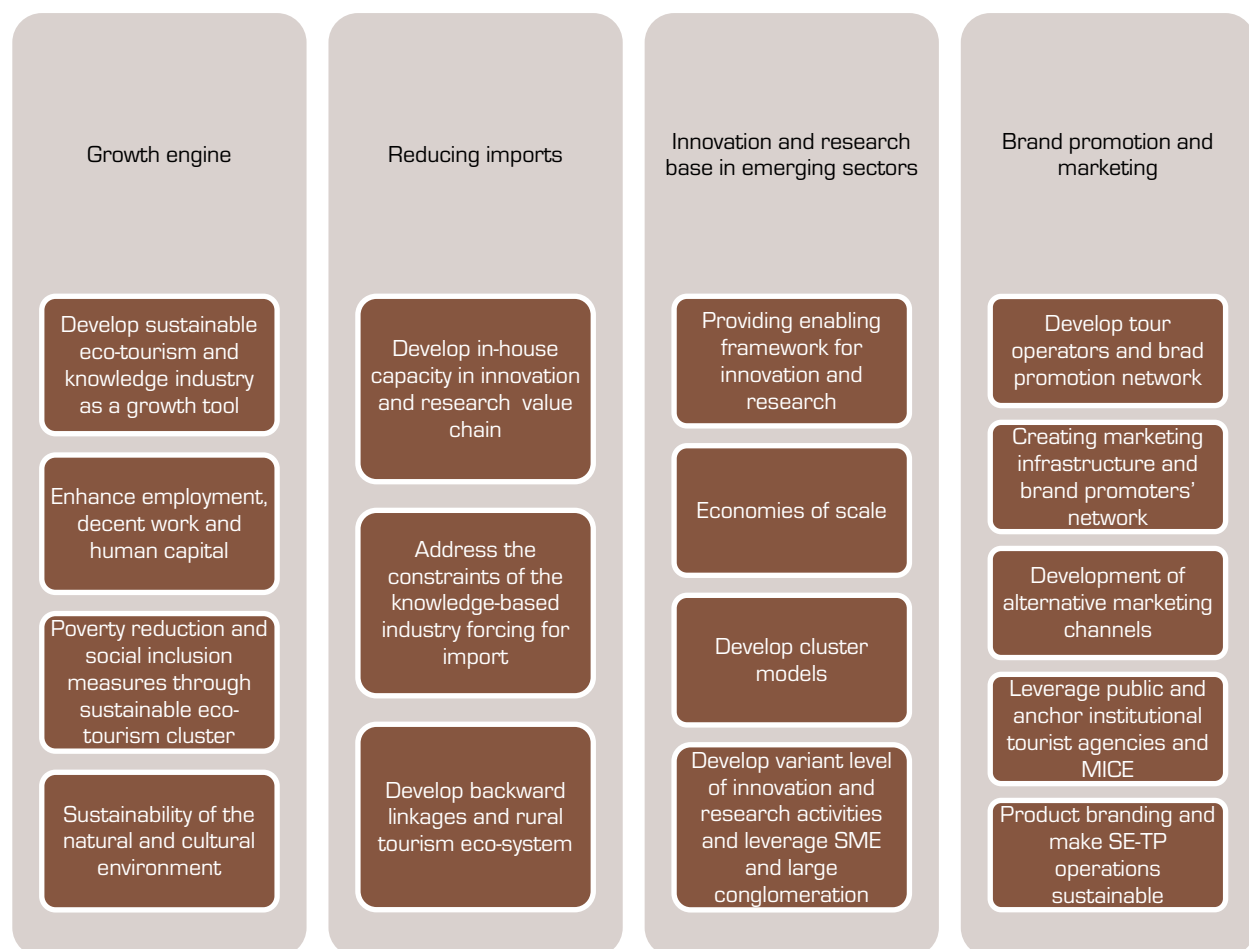


Source: MACE analysis

The SE-TP aims to provide a mechanism to bring together natural and cultural environment, sustainable utilisation of natural assets, strengthening pro-poor tourism initiatives, employment decent work and human capital and tourism and knowledge-based activities as an economic growth engine. Further research institutions, skill development institutions and government agencies are also

networked. The approach is to ensure maximisation of value-added to the country, minimisation of imports, maximising tourist earnings and providing impetus to “Make in Bangladesh” and improving the economic and social profile of the country in general and the tourism and knowledge-based sector in particular as depicted in the **Exhibit No. 5.2**.

**Exhibit No. 5.2: Sustainable tourism development and knowledge-based green economy development - end-to-end approach**



*Source: MACE analysis*

The SE-TP shall provide the right direction for the development of the sustainable tourism and knowledge-based green economy sector in an inclusive manner to ensure economic prosperity and better returns to a rural community with improved technological tools, several innovative concepts, and domestic investments and FDIs driven by the private sector.

## 5.2. Focus area, facilitators, enablers, linkages of the SE-TP including IRC-CoE&IDC

**Exhibit No. 5.3** details the linkages between major stakeholders.

**SE-TP – A superior class eco-tourism cluster and green economy hub with state-of-the-art infrastructure facilities**

Focus	Enablers
<ul style="list-style-type: none"> <li>• Sustainable eco-tourism practices</li> <li>• Bio-diversity based tourism products</li> <li>• Strengthening the role of women and youth in sustainable eco-tourism development</li> <li>• Focus sector value addition and innovation &amp; research companies</li> <li>• The regional centre of innovation and knowledge creation</li> <li>• Encouraging synergistic and ingenious relationships between business ventures</li> <li>• SME and large conglomerate investment opportunities - end to end</li> <li>• Targeted sector utilising regional resources and addressing emerging market</li> <li>• Enabling tourism and innovation &amp; research ecosystem</li> <li>• Import substitution through domestic operations</li> <li>• Creation of large-scale local employment</li> <li>• Poverty reduction and inclusion of disadvantaged groups in the tourism sector</li> <li>• Sustainability of the natural and cultural environment</li> </ul>	<ul style="list-style-type: none"> <li>• MP&amp;DP of SE-TP including IRC-CoE&amp;IDC</li> <li>• Facilitating tourism development at the grass-root level</li> <li>• State-of-the-art facilities for sustainable operation of innovation &amp; research activities</li> <li>• State of the art infrastructure for whole family tourism infotainment and other compatible activities</li> <li>• Social and commercial infrastructure</li> <li>• Tourism, innovation &amp; research environmental, physical and social infrastructure;</li> <li>• Adherence to quality standards in tourism services</li> <li>• e-tourism initiatives</li> </ul>
Linkages	Facilitators
<ul style="list-style-type: none"> <li>• Linkages between biodiversity and tourism</li> <li>• Integrating culture into development through tourism</li> <li>• Value chain analysis and local economic development</li> <li>• Linkages with backward support services for tourism activities</li> <li>• Rural tourism activities</li> <li>• Linkages with export requirements and import needs</li> <li>• Linkages with industries, academia, research, government and other end users</li> <li>• Networking with international, national and regional level agencies for technology, investment, and marketing of produce</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable eco-tourism policies and strategies</li> <li>• Development of investment policies in tourism and knowledge-based economy</li> <li>• Mandates from various Government departments in policy matters</li> <li>• Testing the pioneering ideas</li> <li>• Augment government initiatives in sustainable tourism and knowledge-based green economy sector</li> <li>• Evolving institutional mechanisms and new relationship models for building sustainable and competitive research-driven ventures</li> <li>• Capacity building and training programmes in eco-tourism development and management</li> <li>• Sustainable eco-tourism campaigns</li> <li>• Promote international collaboration for export opportunities leveraging the country's advantage and reducing import dependence considering excessive imports</li> <li>• Organise beneficial interactive meetings, Business to Business (B<sub>2</sub>B), at the regional, national and international level</li> </ul>

*Source: MACE analysis*

### 5.3. Key consideration

**Exhibit No. 5.4** depicts the key aspects covering zoning processes, physical resources regarding general infrastructure and specialised tourism, innovation & research infrastructure and facilities. Further, the Exhibit also outlines the funding and project development structure,

governance, establishing strategic alliances and building relationships with corporate, industry, country partnerships, government, research organisations, professional societies, and society. The master plan deals with these aspects while developing a vision and mission for the proposed SE-TP.

#### Exhibit No. 5.4: Key considerations – vision and mission

##### Positioning

- To develop an international class vibrant eco-tourism and innovation & research hub
- To promote the development of all areas of sustainable tourism and knowledge based green economy sector and related services to the highest possible levels of excellence, through extensively networked programs
- Preferred tourist destination for domestic and foreign tourists across age group, culture and socio-economic strata
- Preferred home to national, international companies, professionals, experts and universities
- Focus on sustainability of natural and cultural environment and as a vehicle for large scale local employment

##### Partnering and networking

- Partnering with renowned tourist operators and global tourist networking agencies;
- Rural tourism and supply chain engagements for tour operators
- Partnering with renowned experts and domestic/international universities and institutions
- Partnering with countries renowned in promoting sustainable technologies
- Excellence, through extensively networked educational, training, research programmes
- To establish strong links between stakeholders and end users
- To establish industry, government, academia networking

##### Infrastructure

- A premier world class sustainable tourism, innovation & research hub, internationally renowned for its infrastructure, linkages, knowledge capital and creative thinking and energy

##### Activities and products

- To provide sustainable eco-tourism and innovation & research activities enabling environment which addresses the problem relevant to the region and nation
- Capacity building programmes in tourism
- Tourism business development
- To provide quality standards in tourism services
- To carry out these activities from a scientific, strategic, business and society focused point of view

##### Affordability and social inclusion

- Providing best environment for tourism and green knowledge business with innovative offerings and options at an affordable cost structure
- An integrated approach to poverty reduction, strengthening pro-poor tourism initiatives, inclusion of disadvantaged groups and creation of largescale rural employment opportunities through SE-TP initiatives

*Source: MACE analysis*

**Exhibit No. 5.5** shows the specific issues addressed during the process. The core purpose is to identify key external issues having an

influence on SE-TP over the projected near-term, including analysing how these issues are likely to affect SE-TP development plans and operations.

**Exhibit No. 5.5: Specific topics considered - vision and mission**

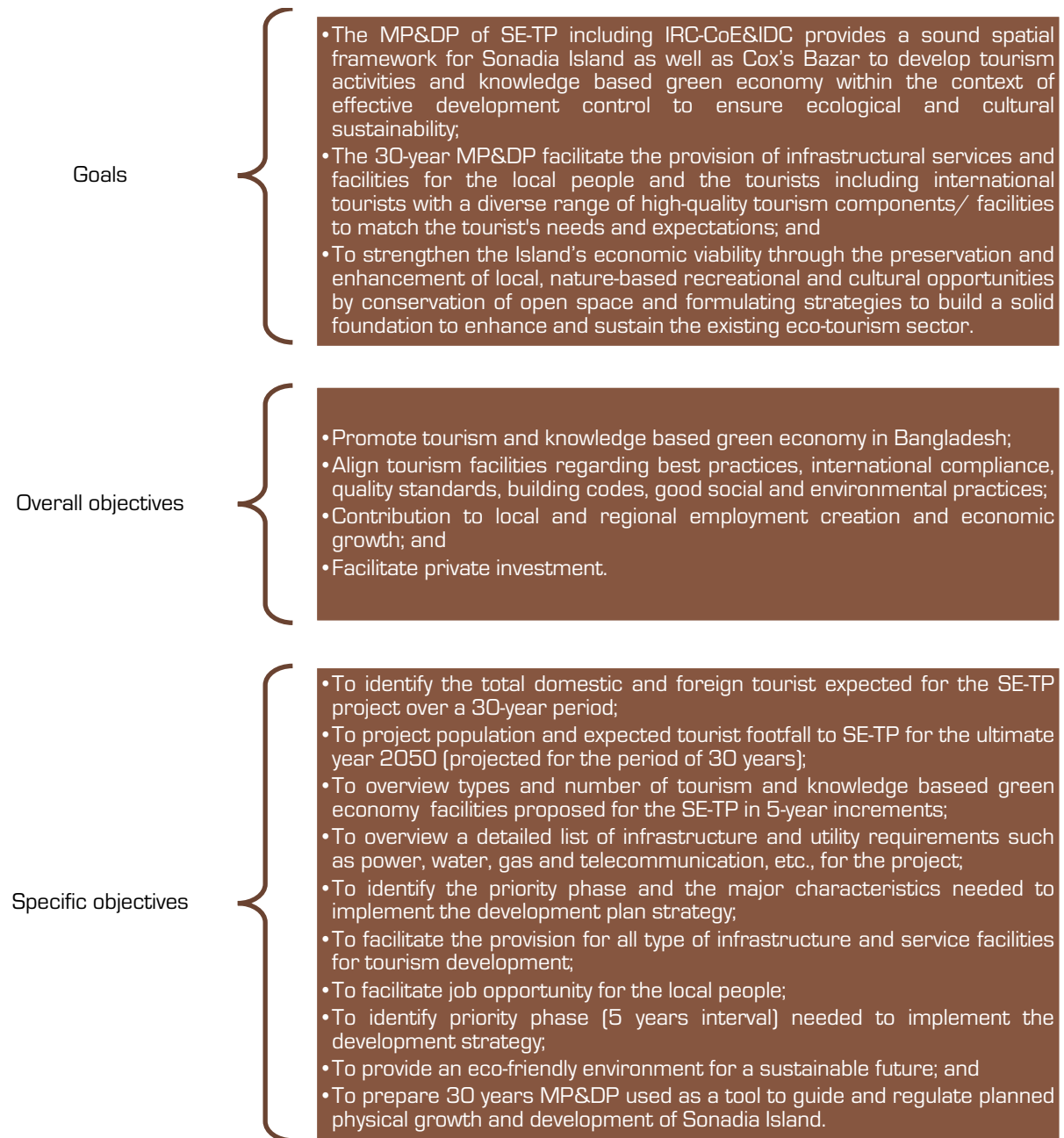
<p style="text-align: center;"><b>Constraints or problems</b></p> <ul style="list-style-type: none"> <li>• Affecting the sector</li> <li>• Affecting current and targeted segments</li> </ul>	<p style="text-align: center;"><b>Potential competitors</b></p> <ul style="list-style-type: none"> <li>• Focus areas, products, services</li> </ul>	<p style="text-align: center;"><b>New and likely competitors</b></p> <ul style="list-style-type: none"> <li>• In three to five years</li> <li>• Strategies</li> <li>• Partnership and linkages</li> </ul>
<p style="text-align: center;"><b>Anticipated trend in the next five years</b></p> <ul style="list-style-type: none"> <li>• Sustainable practices, value addition, new products</li> <li>• New segments</li> <li>• Industry needs</li> <li>• Application of sustainable tourism indicators</li> </ul>	<p style="text-align: center;"><b>Trends, constraints, or problems</b></p> <ul style="list-style-type: none"> <li>• New and emerging area, regulatory changes, changing technology, new service/market developments</li> <li>• Bio-diversity conservation and bio-diversity based tourism products</li> <li>• e-tourism</li> <li>• Domestic tourists</li> <li>• Foreign tourists</li> <li>• Consumers</li> <li>• Industry</li> </ul>	<p style="text-align: center;"><b>The impact due to prospective changes</b></p> <ul style="list-style-type: none"> <li>• Business model</li> <li>• Smart applications in tourism sector</li> <li>• Disruptive innovation in emerging areas</li> <li>• Approach towards sustainable eco-tourism</li> </ul>

*Source: MACE analysis*

**5.4. Goals and objectives**

The goals with overall & specific objectives are provided in **Exhibit No. 5.6**.

## Exhibit No. 5.6: Goals, overall &amp; specific objectives



*Source: MACE analysis*

## 5.5. Vision

The building blocks for formulating the vision are as under:

- To develop a sustainable eco-tourism sector targeting domestic and foreign tourists;
- To promote knowledge-based green economy activities and enhancing innovation & research capabilities on emerging sectors in Bangladesh;
- To position SE-TP as a preferred tourist destination;
- To conceptualise SE-TP as a preferred destination for innovation & research activities, harnessing the domestic market and leverage export potential of Bangladesh in the knowledge-based green economy sector;
- To achieve sustainable eco-tourism and green economic growth by creating excellent tourism, innovation & research, environmental, physical and social infrastructure;
- To establish a robust structure for sustainable eco-tourism;
- To establish a robust structure for innovation & research through investor-friendly policy framework and transparent governance;
- To provide an enabling environment for import substitution and enhance domestic productivity; and
- To boost private sector investments in eco-tourism, infrastructure and knowledge-based segments.

The vision for SE-TP, including IRC-CoE&IDC development in Bangladesh, is:

*“Achieving self-sustenance and developing sustainable eco-tourism and knowledge-based green economy sector through the development of tourism, innovation & research infrastructure and creation of conducive tourism and investment eco-system.”*

*Thus, the vision for SE-TP from tourism perspective “shall facilitate the tourists to enjoy, admire, study and experience the bio-diversities,*

*natural beauty and pleasantness of the Island without disturbing its ecology, environment and unique features with the aim of promoting the tourism in a sustainable way and increasing the economy & employment opportunities for the locals”.*

*Thus, the vision for IRC-CoE&IDC from the knowledge-based green economy perspective.” a premier world-class innovation and research hub, internationally renowned for its knowledge capital - preferred home to international and domestic companies providing cutting edge research technology in the emerging areas of life sciences, alternative energy, environment, climate change, energy-efficient built in the environment, smart cities & communities, sustainability and advanced materials.”*

## 5.6. Mission

- To provide effective linkage for sustainable eco-tourism;
- To provide effective linkage and symbiosis between knowledge-based green companies located in SE-TP;
- To establish a world-class ecosystem that enables value creation by enabling conducive tourism and business environment, capacity building, skill development and experiential learning to significantly impact monetary and resource cutbacks and build sustainable solutions of national importance;
- To promote the development of all areas of sustainable eco-tourism and knowledge sectors to the highest possible levels of excellence, through extensively networked educational, research, training, and development programs; and
- To establish strong links between stakeholders to harbour the best professional capabilities in sustainable tourism and knowledge-based green economy sector.



## Chapter - 6

# Tourist survey and projection

### 6.1. Preamble and approach for tourist survey and projection

International tourist arrivals (overnight visitors) grew by 4% in January-March 2019 compared to the same period last year, below the 6% average growth of the past two years (UNWTO).

Bangladesh is a destination to admire the beauty of natural features having rivers, sea coast, various bio-diversities, archaeological sites, etc. To enjoy this beauty of nature, a huge amount of domestic and foreign tourists visit the country, since it holds many attractive tourist spots.

No definite conclusive survey or study are found which illustrates spot wise the number of tourists visiting Bangladesh. However, the data from several reports and literature related to tourism have been studied. The picturesque spots scattered within Bangladesh attracts a large number of domestic and international tourists. At present, Cox's Bazar is known as one of the most important tourist sites of Bangladesh. Several tourists, including both domestic and international tourists, visit Cox's Bazar every year. The hurdles, such as the poor condition of roads and minimal availability of ferries, restrict the number of tourists in Cox's Bazar, which may increase rapidly upon removal of these hurdles. It is pertinent to collect relevant information on the tourists' expectations, problems they are facing, and their suggestions to improve the situation. In fact, these are the vital information needed to prepare the MP&DP for SE-TP to make Sonadia Island as a full-fledged tourist centre of international standard. Thus, tourist survey is an important part of this project to understand the requirements/ expectations of the tourists.

### 6.2. Tourist spots and potential of Sonadia Island

The study analysed the existing tourist spots and potential of Sonadia Island and are presented in [Annexure-6A](#).

### 6.3. Tourists survey

In order to get an idea about existing tourist facilities, problems they are facing and expectations of the tourists at Cox's Bazar, a questionnaire survey has been conducted among 104 tourists through random selection approach. The in-depth analysis of the tourist survey is presented in [Annexure-6A](#).

The recommendations regarding the expectations/requirements derived from tourists' survey for planning SE-TP are as follows:

- Affordable pricing and security to be provided especially for female;
- Park, water park, swimming facilities and cottages to be planned within SE-TP;
- Prayer place and public restrooms facilities are required;
- Different range of food facilities to be provided;
- Sea aquarium and amusement facilities to be planned;
- Special arrangements to be made for children, play zone with other facilities; and
- Tourist boat and rider with proper management measures to be planned.

## 6.4. Bangladesh tourism performance on select indicators

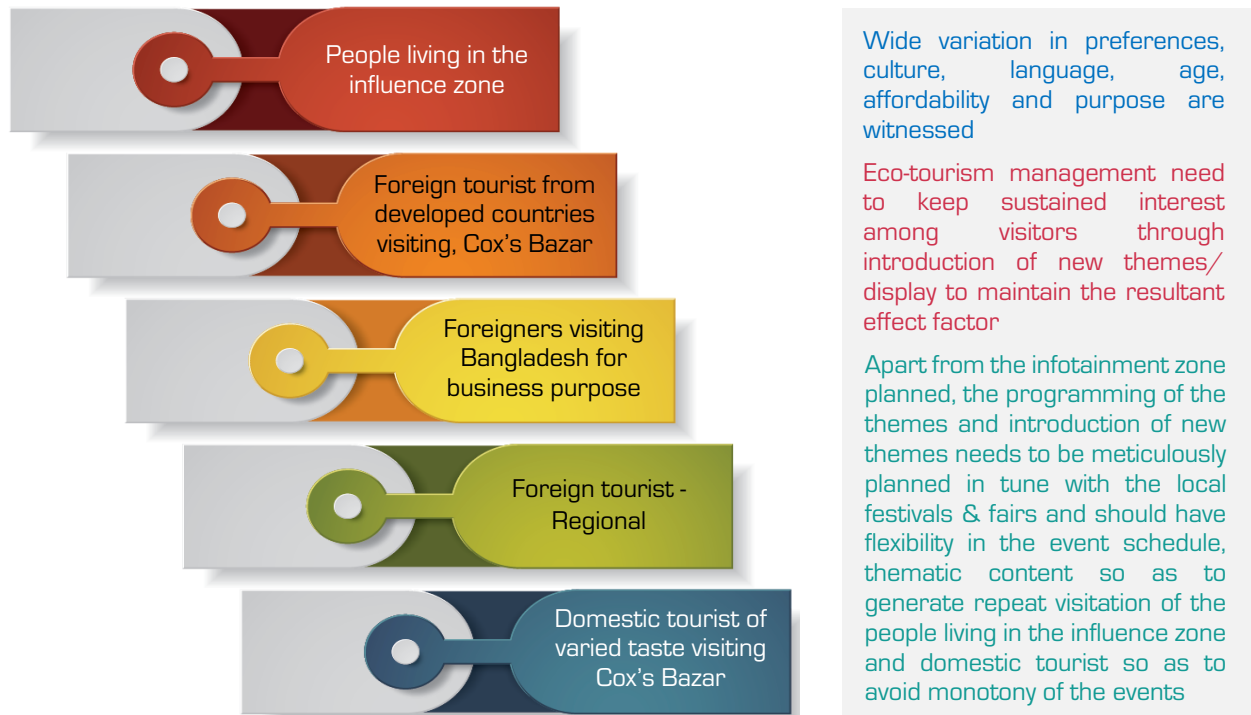
### 6.4.1. Population projection

The population growth and the physical expansions of the town or Upazila are interrelated. To accommodate the growing population, new areas are required not only for residence but also for other functional components like a commercial, road infrastructure, service facilities, etc. The population projection has been estimated by considering both the natural increase of the existing population and the balance between migrations of people in the Upazila area.

Population projection has been carried out for 30-years. Exponential compound growth method has been used for population projection. Upon developing SE-TP, there are chances for an increase in employment opportunities which may act as an inducer for population growth of the region. Hence, exponential compound growth method having cumulative growth of population has been adopted for the population projection.

The diverse nature of tourist considered for the demand model is depicted in **Exhibit No. 6.1**.

**Exhibit No. 6.1: Diverse nature of tourist and vast expectations result in multi-formatted infotainment**



*Source: MACE analysis*

It is proposed to rehabilitate the people of effective planning area in Sonadia Island to the proposed rehabilitation site located to the Northeast of Sonadia Island. In the social aspect, it is proposed to plan the basic utilities and infrastructure for the rehabilitated people while planning the infrastructure for SE-TP. Hence, population projection of Sonadia Island has been carried out, and these aspects are dovetailed in

infrastructure planning of the rehabilitated site and SE-TP.

According to the IoL survey, there are totally 315 households having 1762 people living in the proposed effective planning area. **Table No. 6.1** depicts the projected population from 2020-2050, respectively. According to the population projection, considering the Maheshkhali Upazila

growth rate of 2.24% (BBS, 2011), the projected population of Sonadia Island (Planning area) will be

4274 in 2050. This will be considered while planning the infrastructure and utilities for SE-TP.

**Table No. 6.1: Projected population of Sonadia Island**

Area	Population (2011)	Growth rate (BBS, 2011)	2020	2025	2030	2035	2040	2045	2050
Sonadia Island	1762	2.24	2199	2457	2744	3066	3425	3826	4274

*Source: DevCon analysis*

#### 6.4.2. Baseline data and assumptions for tourist's projection

The projection on tourists has been made to estimate the need for accommodations and other related services and facilities. Also, it helps in estimating the additional traffic due to the project on the existing highway and to analyse its capacity sufficiency.

For the purpose of arriving the expected tourist's footfall to SE-TP, the domestic tourists and international tourists visiting Cox's Bazar needs to be considered. It is assumed that some percentage of the tourists visiting Cox's Bazar will visit SE-TP being major attracting tourists spot in the surrounding.

There is no proper database related to the number of tourists visiting Cox's Bazar. Hence, various considerations and assumptions related to tourist's data and projection are adopted, which are discussed in [Annexure-6A](#).

#### 6.4.3. Domestic tourists' projection and expected domestic tourists' footfall for SE-TP

The detailed analysis of projected domestic tourists' footfall of Bangladesh, domestic tourist footfall to Cox's Bazar is presented in [Annexure-6A](#).

The SE-TP is a greenfield development. Hence, the expected tourist's footfall to the SE-TP has been arrived based on the assumption that the domestic tourists visiting Cox's Bazar will be visiting all the tourist's spots in the vicinity, including SE-TP. Hence, % of domestic tourist's visitors to SE-TP out of total domestic tourists' footfall of Cox's Bazar has been assumed under three scenarios and based on the same, the predicted tourist's footfall to Cox's Bazar is provided in [Table No. 6.2](#).

**Table No. 6.2: Projected annual domestic tourists' arrival to SE-TP**

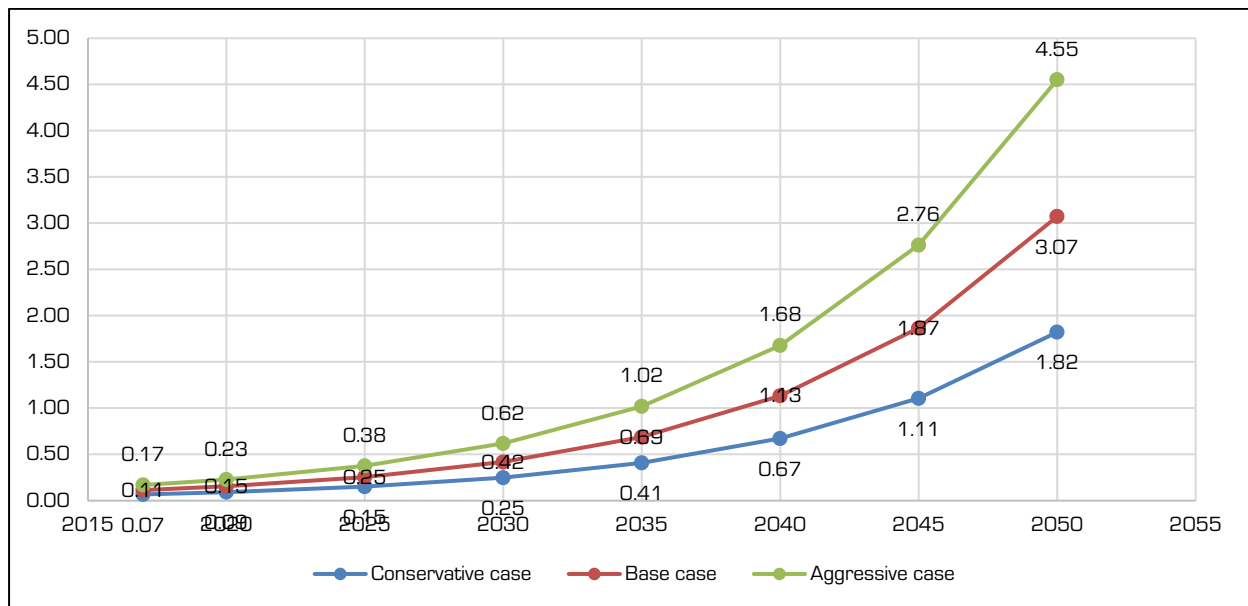
Year	Projected annual domestic tourists' arrival to SE-TP (in millions)		
	Conservative case	Base case	Aggressive case
2017	0.07	0.11	0.17
2020	0.09	0.15	0.23
2025	0.15	0.25	0.38
2030	0.25	0.42	0.62
2035	0.41	0.69	1.02
2040	0.67	1.13	1.68
2045	1.11	1.87	2.76
2050	1.82	3.07	4.55

*Source: "Feasibility study for the Economic Zone Site in Sonadia", BEZA*

*Note: The base year considered is 2017, and the % of domestic tourists visiting SE-TP annually out of total annual domestic tourists' footfall of Cox's Bazar is assumed to be 5.00% in case of conservative scenario, 7.50% in case of base scenario and 10.00% in case of the aggressive case scenario.*

The trend of projected annual domestic tourists to SE-TP under three scenarios are depicted in Exhibit No. 6.2.

Exhibit No. 6.2: Projected domestic tourists arrival per annum to SE-TP (in millions)



Source: "Feasibility study for the Economic Zone Site in Sonadia", BEZA

Table No. 6.3: Summary of projected domestic tourists' footfall to SE-TP for the year 2050

Expected annual domestic tourists' footfall to SE-TP (in a million)	Conservative	Base	Aggressive
	1.82	3.07	4.55

#### 6.4.4. International tourists' projection and expected International tourists' footfall for SE-TP

The detailed analysis of projected international tourists' footfall of Bangladesh, international tourist footfall to Cox's Bazar is presented in [Annexure-6A](#).

As enumerated earlier, the SE-TP is a greenfield development and hence, the expected

tourist's footfall to the SE-TP has been arrived based on the assumption that the international tourists visiting Cox's Bazar will be visiting all the tourist's spots in the vicinity including SE-TP. Hence, % of international tourist's arrival to SE-TP out of total international tourists' footfall of Cox's Bazar has been assumed under three scenarios and based on the same, the predicted tourist's footfall to Cox's Bazar is provided in [Table No. 6.4](#).

Table No. 6.4: Projected annual international tourists' arrival to SE-TP

Year	Projected annual international tourists' arrival to SE-TP (in millions)		
	Conservative case	Base case	Aggressive case
2019	0.06	0.08	0.09
2020	0.07	0.08	0.10
2025	0.10	0.12	0.14
2030	0.15	0.18	0.21
2035	0.23	0.27	0.31

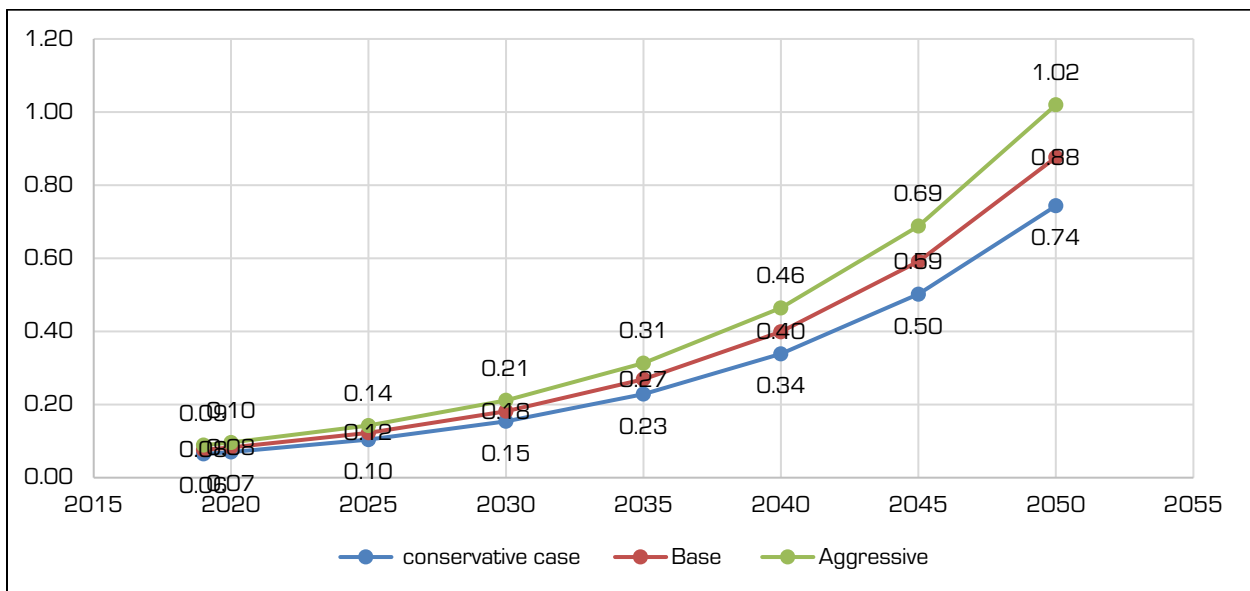
Year	Projected annual international tourists' arrival to SE-TP (in millions)		
	Conservative case	Base case	Aggressive case
2040	0.34	0.40	0.46
2045	0.50	0.59	0.69
2050	0.74	0.88	1.02

**Source:** "Feasibility study for the Economic Zone Site in Sonadia", BEZA

**Note:** The base year considered is 2019, and the % of international tourists visiting SE-TP annually out of total annual international tourists' footfall of Cox's Bazar is assumed to be 50% in case of conservative scenario, 55% in case of base scenario and 60% in case of the aggressive case scenario.

The trend of projected annual international tourists to SE-TP under three scenarios are depicted in Exhibit No. 6.3.

**Exhibit No. 6.3: Projected international tourists arrival per annum to SE-TP (in millions)**



**Source:** "Feasibility study for the Economic Zone Site in Sonadia", BEZA

**Table No. 6.5: Summary of projected international tourists' footfall per annum to Sonadia Island**

Expected annual international tourists' footfall to SE-TP (in million)	Conservative	Base	Aggressive
	0.74	0.88	1.02

**Source:** "Feasibility study for the Economic Zone Site in Sonadia", BEZA

### 6.5. Summary of total tourists' footfall to SE-TP

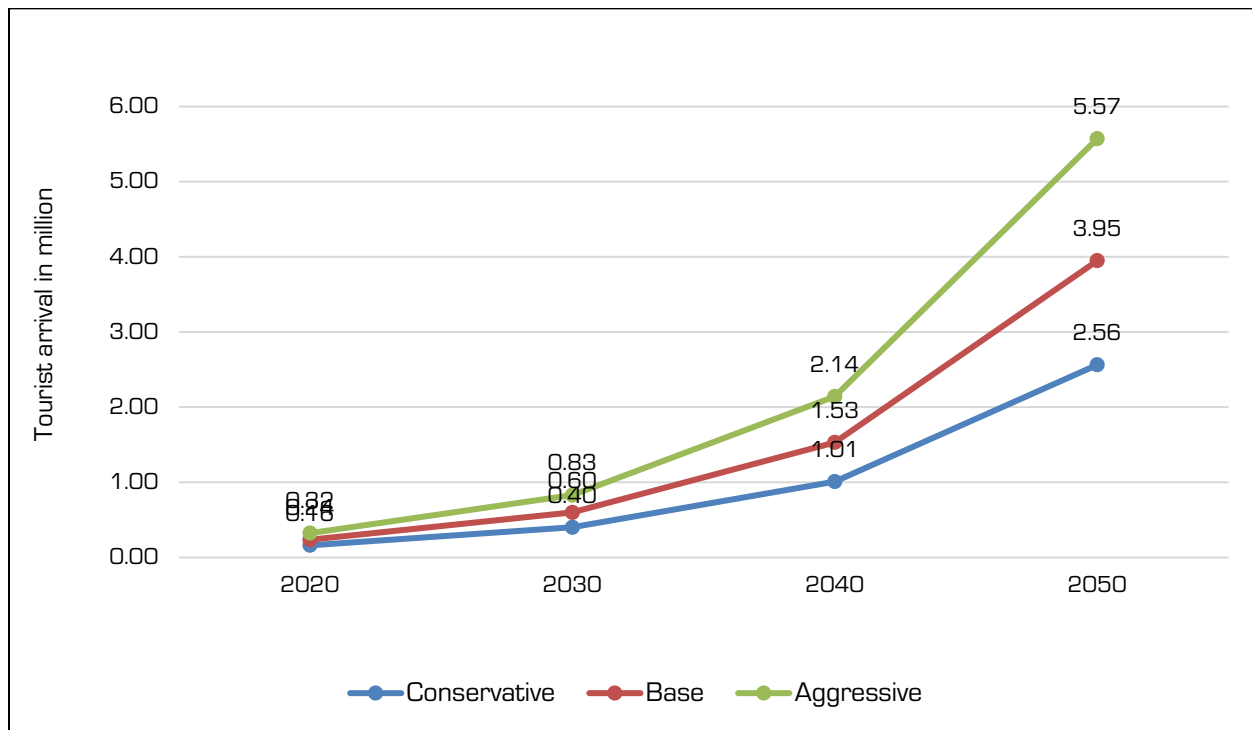
Table No. 6.6 and Exhibit No. 6.4 present summary of total tourists' footfall to SE-TP.

Table No. 6.6: Summary of total annual tourists' footfall to SE-TP

Description	2020			2030			2040			2050		
	Conservative	Base	Aggressive	Conservative	Base	Aggressive	Conservative	Base	Aggressive	Conservative	Base	Aggressive
Expected annual domestic tourists' footfall to SE-TP (in million)	0.09	0.15	0.23	0.25	0.42	0.62	0.67	1.13	1.68	1.82	3.07	4.55
Expected annual international tourists' footfall to SE-TP (in million)	0.07	0.08	0.10	0.15	0.18	0.21	0.34	0.40	0.46	0.74	0.88	1.02
<b>Total expected annual tourists' footfall to SE-TP (in million)</b>	<b>0.16</b>	<b>0.24</b>	<b>0.32</b>	<b>0.40</b>	<b>0.60</b>	<b>0.83</b>	<b>1.01</b>	<b>1.53</b>	<b>2.14</b>	<b>2.56</b>	<b>3.95</b>	<b>5.57</b>

Source: "Feasibility study for the Economic Zone Site in Sonadia", BEZA

Exhibit No. 6.4: Total expected annual tourists' footfall to SE-TP (in millions)



Source: "Feasibility study for the Economic Zone Site in Sonadia", BEZA

## Chapter - 7

# Benchmarking - domestic and international comparable

### 7.1. Categorisation

Over a period of time, tourism has experienced continued growth and increased diversification, becoming one of the fastest developing economic sectors in the world. These dynamics have turned it into a key driver for socio-economic progress in nations worldwide. The impact of tourism as a driver of development has been felt in many countries. For example, in recent years tourism was the main factor in the graduation of Botswana, the Maldives and Cape Verde from their status of least developed countries.

To make SE-TP as the most attractive tourist destination for both domestic and international tourist, it is planned to provide high-end facilities and components within the park while preserving the bio-diversity, ecology, traditional and heritage values. To fulfil this aim, various case studies have been analysed to arrive attractive infotainment product mix to make SE-TP as a unique masterpiece in the world of tourism. Strategic benchmarking of international comparable on eco-tourism zones and tourist attractions are carried out, and the chapter dwells on various aspects of benchmarking exercise. Inclusive, sustainable eco-tourism is coined to be a disruptive offering of SE-TP.

A few successful examples of eco-tourism zones/tourist attraction facilities across the world are studied, and as a part of this, the benchmarking exercise for the Eco-Tourism cluster is carried out considering the following parameters:

- Review of eco-restoration and conservation;
- Scale;
- Review of various attractive components;

- Facilities;
- Review of pricing;
- Key success factors;
- Rationale;
- Development model;
- Regulation and quality assurance;
- Regulatory framework;
- Collaboration;
- Lessons learnt;
- Performance; and
- Study the facilities in the proven existing eco-tourism and analyse the merits/demerits in adopting the same in the regional context.

SE-TP development is being contemplated as a conducive eco-system comprising of sustainable eco-tourism zone, international tourist attraction facilities, business hub for promoting a knowledge-based green economy. Hence, the benchmarking exercise is categorised and discussed under the following four groups:

1. Distinct ecosystems having tourism as a major growth engine;
2. International tourist attraction facilities;
3. Tourism based EZs; and
4. International innovation & research hubs.

#### *7.1.1. Distinct ecosystems having tourism as a major growth engine*

The following five distinct ecosystems having tourism as a major growth engine are considered for benchmarking exercise.

- Sumatra, Indonesia
- Borneo, Malaysia
- Kerala, India
- Palau
- Norwegian Fjords
- Costa Rica
- Kenya



Source: MACE analysis

The details of the above five distinct ecosystems are provided in **Annexure-7A**.

*7.1.2. International tourist attraction facilities*

Marine leisure, entertainment and marine infotainment are configured as one of the unique, attractive components for the SE-TP. Hence to make the proposed oceanarium as a state-of-the-art facility, various internationally renowned oceanariums have been studied. The following international attraction facilities are considered for benchmarking.

- Oceanopolis, Brest, France
- Nausicaa, France
- Manila Ocean Park, Philippines
- Shanghai Oceanarium, China
- Lisbon Oceanarium, Portugal
- Melbourne Oceanarium, Victoria Australia
- The underwater world at Sentosa, Singapore
- Manly Underwater world, Sydney
- Marine land, Florida



Exhibit No. 7.2: International comparable – tourist attraction facilities



Source: MACE analysis

The details of the above international tourist attraction facilities are provided in **Annexure 7B**.

7.1.3. Tourism based EZs

Tourism based EZ is being planned in Sonadia area in Cox’s Bazar District. It is envisaged that this tourism zone will be equipped with all required facilities and will attract visitors from both domestic and foreign tourist. In addition, knowledge-based economic activities and research activities are contemplated in the SE-TP.

Bangladesh has recently witnessed the development of a number of EZs by both private developers and Government agency (BEZA). Although most of them are still at planning stages, some of them are at active stages of marketing as well. Hence, two such tourism-based economic zones in Jaliardwip and Sabrang from Bangladesh have been selected for the benchmarking exercise.

A benchmarking exercise on EZs considered the following aspects:

- The rise of the zones: origin, objectives, and diffusion, the evolution of EZs
- Definition and typology
- Varieties of zones: modalities, ownership and evolution
- Features, characteristics and key issues of EZs
- Success outcomes and drivers of EZs performance
- Development strategy and institutions
- Economic impact and significance of EZs
- Learning from experience: preconditions and policies
- EZs as investment facilitation tools, drivers and motivations of FDI in EZs development
- Developers of EZs
- The role played by each actor
- EZs tenants
- Success and failure models

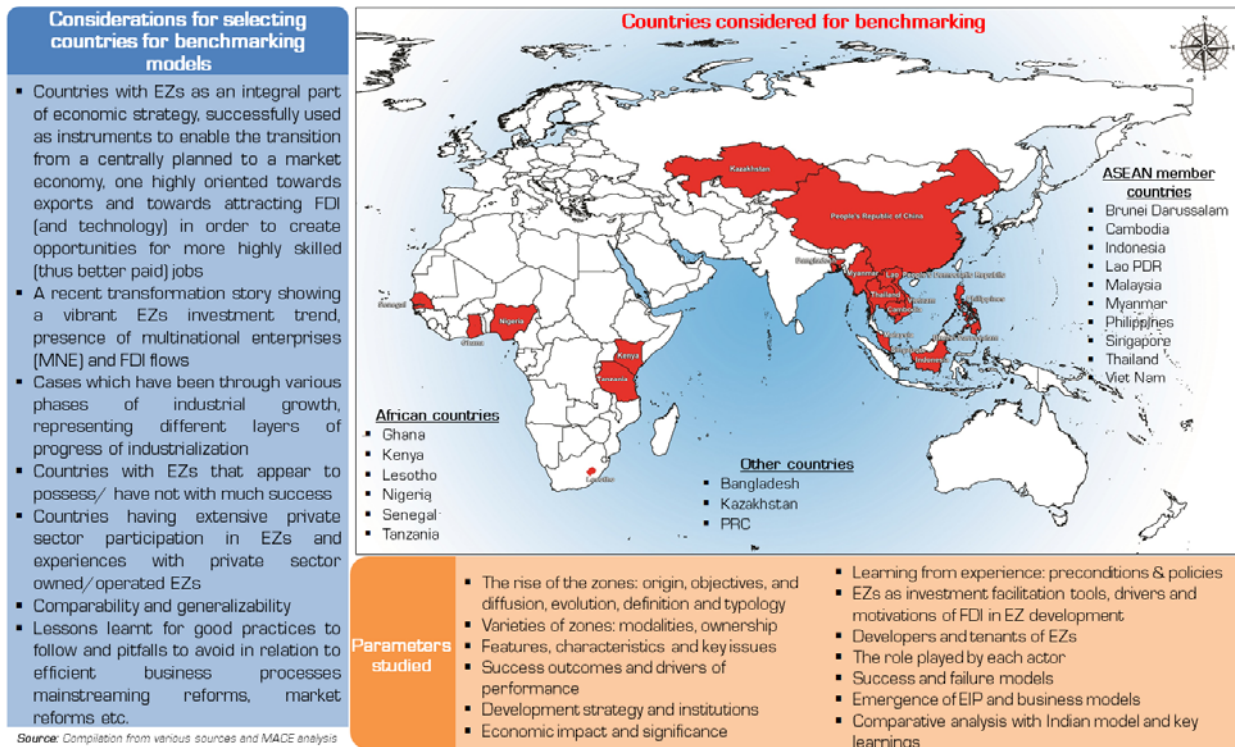
- Definitions of eco-industrial parks (EIPs), basic concepts and perspectives
- A typology for EIPs and perspectives
- Sustainable, EIP and smart components leveraging industrial ecology and industrial symbiosis
- The emergence of EIP in different geographies and business models
- Countries considered for benchmarking include People’s Republic of China (PRC), Malaysia, Viet Nam, Indonesia, Singapore, Philippines, Thailand, Brunei Darussalam, Myanmar, Cambodia, Lao People’s Democratic Republic (Lao PDR), Bangladesh, Kazakhstan, Ghana, Kenya,

- Honduras, Lesotho, Nigeria, Senegal and Tanzania
- The model specifically analysed the private sector involvement EZs development and success and failures of various business models

Tourism zones from the Philippines and Indonesia have been selected for benchmarking because of the similar socio-economic conditions and objectives of developing tourism zones.

While identifying the competitors, it has been considered that these tourism-based EZs are similar in size and are at a similar stage of development<sup>1</sup>.

**Exhibit No. 7.3: International comparable: location of the tourism-based EZs**



**Source:** MACE analysis

**Note:** This map is a generalised illustration only and is not intended to be used for reference purposes. The representation of political boundaries and the names of geographical features do not necessarily reflect the position of the GoB or Government of neighbouring countries on international issues of recognition, sovereignty, jurisdiction or nomenclature.

The details of the above EZs are provided in **Annexure-7C**.

<sup>1</sup> Some reference to the domestic and international competitors/case studies have been taken from the draft

interim report of “Feasibility study for the Economic Zone Site in Sonadia”, BEZA.

**7.1.4. International innovation & research hubs**

A review of the following international innovation & research hub is carried out as a part of benchmarking to configure IRC-CoE&IDC.

- Research Triangle Park, North Carolina, USA
- Cummings Research Park, Huntsville, Alabama, USA
- Heidelberg Technology Park, Germany
- Singapore Science Park, Singapore
- Qatar Science and Technology Park, Qatar
- Hongkong Science and Technology Park, Hongkong
- Masdar, Abu Dhabi, UAE
- Sophia Antipolis Science Park, France
- Biopolis & Fusionopolis, Singapore.

The details of the above research hubs are provided in **Annexure-7D**.

**7.2. Considerations from benchmarking exercise**

**Annexure-7B** provides a detailed comparative study of various eco-tourism zones which could compete with the proposed SE-TP. **Annexure No** provides a detailed comparative study of various tourist attraction facilities which could compete with the proposed SE-TP. **Annexure-7B** provides a detailed comparative study of various tourism-based EZs, which could compete with the proposed SE-TP. The tourism zones studied for comparative purpose are located in the South East Asia region, have similar geography and have similar offerings as the proposed SE-TP. **Annexure-7B** provides a detailed comparative study of various research hubs which could compete with the proposed SE-TP.

**Table No. 7.1** provides the key inferences derived from the benchmarking exercise reflecting the fundamental characteristics required for sustainable development of eco-tourism and knowledge-based green economy.

**Table No. 7.1: Key inferences from benchmarking exercise**

Eco-Tourism cluster fundamental characteristics	<ul style="list-style-type: none"> <li>• Large scale holistic development of infotainment model and whole family engagement;</li> <li>• Conservation and protection of biodiversity and preserve cultural values and national pride;</li> <li>• The economy of scale that facilitates the occupant units to achieve the required threshold;</li> <li>• Excellent forward and backward linkages with synergy among the tourist/occupants and tourism value chain actors/ suppliers;</li> <li>• State-of-the-art infrastructure facilities;</li> <li>• World-class O&amp;M strategies and support;</li> <li>• Safety and security of tourist and hygienic environment;</li> <li>• Technology and innovation has driven the development; and</li> <li>• Private sector playing a meaningful role in the entire development cycle.</li> </ul>
The general approach for providing a competitive edge	<ul style="list-style-type: none"> <li>• The SE-TP shall focus on benchmarking its facility configuration and processes to international standards to improve performance, governance standards, efficiency, market value, an affordable price structure that shall, in turn, enhance the competitiveness of tourism sector and knowledge-based innovation and research sector of Bangladesh.</li> <li>• SE-TP shall always endeavour to direct and streamline all its efforts to establish unparalleled identity and create a niche not only at the project level but for the entire tourism sector and knowledge-based green economy sector.</li> </ul>

<p>Poverty alleviation, social inclusion, capacity building and rural tourism initiatives</p>	<ul style="list-style-type: none"> <li>• The contribution of tourism to economic well-being depends on the quality and the revenues of the tourism offer;</li> <li>• As per UNWTO on analysis of tourism development trends world-wide, following are three major inference in connection with tourism and its potential for poverty alleviation:</li> <li>• Tourism is one of the most dynamic economic sectors in many countries, developed but also developing ones, with a wide range of upstream and downstream effects on other economic activities thanks to a very large and diversified supply chain;</li> <li>• Tourist movements towards developing and least developed countries are growing faster than in the developed world, accounting for almost 50% per cent of total international tourist arrivals;</li> <li>• Many developing countries do have assets of enormous value to the tourism sector, such as culture, art, landscape, wildlife and climate, and are very well positioned to develop tourism as a key sector contributing to economic growth; and</li> <li>• Tourism in many developing and least developed countries is one of the principal sources and in some countries the main source, of foreign exchange earnings and, quite often, the most viable and sustainable economic development option, with positive impacts on reducing poverty levels.</li> </ul>
<p>Competitiveness of the proposed EZ site as compared to its competitors</p>	<ul style="list-style-type: none"> <li>• Hospitality and foodservice sectors form the base of the tourism industry;</li> <li>• Availability of manpower at low cost in Bangladesh will help in bringing down the cost of offerings to the tourists as compared to other countries;</li> <li>• This will help to attract tourists from countries with a burgeoning middle class;</li> <li>• Low cost of air travel from countries such as India and China will help in attracting a greater number of price-sensitive tourists (especially from the neighbouring countries);</li> <li>• Already in place, EZ policy which offers an incentive to investors will bring in capital to develop facilities for tourism-based economic zone development; and</li> <li>• Offering resident visa and citizenship at lower investment value as compared to its competitors will attract the number of foreign investors.</li> </ul>
<p>Areas where the proposed EZ site is lagging behind its competitors</p>	<ul style="list-style-type: none"> <li>• Bangladesh ranks 125<sup>th</sup> on travel and tourism competitiveness index published by World Economic Forum owing to poor infrastructure and other facilities conducive to tourism as compared to its peers;</li> <li>• Considerable investment in developing these facilities is required to be able to compete with other tourism zones;</li> <li>• Capping foreign workers to a total of 5% of the total manpower in the business might restrict the inflow of skilled manpower required in the tourism industry; and</li> <li>• Bangladesh fares poorly in English proficiency index and ranks 63 among a total of 88 countries. Not being able to communicate well with the tourists might hinder the growth of tourism.</li> </ul>
<p>Infotainment zones</p>	<ul style="list-style-type: none"> <li>• Following are the identified zones for the SE-TP based on international benchmarking considerations and other findings of the study.             <ol style="list-style-type: none"> <li>1. Entrance zone</li> </ol> </li> </ul>

<ol style="list-style-type: none"> <li>2. Heritage &amp; hospitality zone</li> <li>3. Knowledge centre zone</li> <li>4. Family entertainment zone</li> <li>5. Adventure zone</li> <li>6. Eco-science zone</li> </ol> <ul style="list-style-type: none"> <li>• The details of components, TAF and IRC-CoE&amp;IDC proposed are depicted in <b>Table No. 7.2</b>.</li> </ul>
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**Table No. 7.2: Proposed product mix for the project**

Entrance zone	Heritage and hospitality zone	Knowledge centre zone	Family entertainment zone	Adventure zone	Eco-science zone
Entrance gate/arch	Themed pavilions	Kiosk, atrium	Kiosk	Entertainment hub	Oceanarium
Information kiosk/globe	Water pools	Training/skill development centre	Public square & placemaking	Angling, sports fishing	Marine biology research centre
Jetty	Arts and crafts village	IRC-CoE&IDC	Eco-bridge	Amusement park (wet and dry rides)	Museum/exhibition
Internal road/path	Statue deck	Golf-course	Game parlour	Paragliding	Wooden deck
E-car & cycle parking	Heritage pavilion	Clubhouse	Multi-cuisine restaurant	Parasailing	Sky bridge with telescopes (bird aviary)
Walkway & seating pavilion	Star hotel		Treehouse	Jet skiing	Agro and allied sector tourism
Viewing deck	Budget hotel		Sea view villas	Kiosk/gazebo	Organic cultivation
Seating area	Resorts		Botanical garden	Food courts	Dairy farming
Water pool with musical fountains	Multi-cuisine restaurant		Greenhouses	River deck	Turtle and red crab watching
Security control room	Convention centre		Agro-Tourism	Riverboat jetty	Water pool
Helipad	MICE		Butterfly park		Amphitheatre
	Yoga centre and meditation hall		Green sculptures		Green landscapes
			Green landscapes		Eco-tents
			Open garden		Wooden walkway
			Spa & sauna clinic		
			Campfire		

*Source: MACE analysis and Feasibility study for the Economic Zone Site in Sonadia, BEZA*

**Table No. 7.2**, the outlined product mix is tentative and may vary during the on-ground implementation.

## Chapter - 8

# Site analysis

### 8.1. Salient features

Analysis of site is a pre-requisite task for effective planning. Accordingly, planning and development issues, opportunities prevailing in the project area and its surroundings have been identified. Also, development pattern and future direction of its' growth have been determined. The

issues/constraints bearing on decision making in setting proposals for future development have been analysed. SE-TP thrives on-site features and assets, such as the natural environment, a warm climate, rich cultural heritage and plentiful human resources, thus positioning SE-TP in comparative advantage.

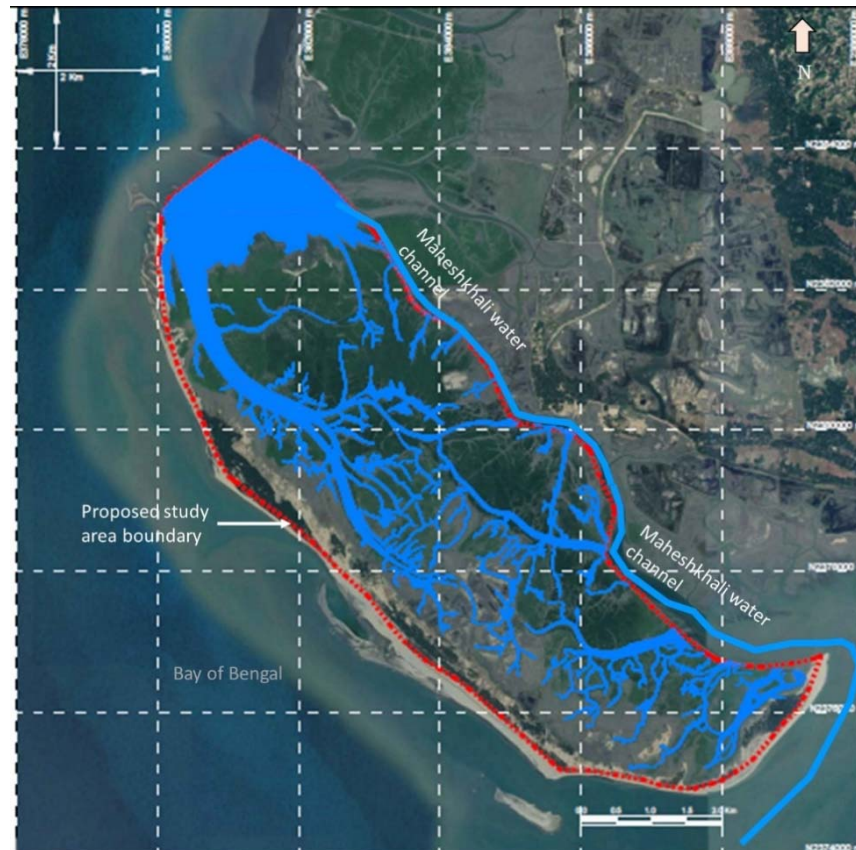
Proposed study area	<ul style="list-style-type: none"> <li>The proposed study area spread across 8967 acres of land in Sonadia Island which falls under Maheshkhali Upazila near Cox's Bazar and is located at 376 km from the National capital, Dhaka and 24 km from the District capital, Cox's Bazar (via. Gorakghata Ghat-Kastura Ghat boat line).</li> </ul>																	
	<p style="text-align: center;"><b>Table No. 8.1: Site parameters</b></p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Details</th> </tr> </thead> <tbody> <tr> <td>Site co-ordinates</td> <td>2374924.377 N - 2386338.522 N &amp; 380091.306 E - 389270.197 E</td> </tr> <tr> <td>Site boundary on East</td> <td>Settlement- Ghatibanga village</td> </tr> <tr> <td>Site boundary on West</td> <td>Sea</td> </tr> <tr> <td>Site boundary on North</td> <td>Maheshkhali water channel</td> </tr> <tr> <td>Site boundary on South</td> <td>Maheshkhali water channel connecting the sea</td> </tr> <tr> <td>Total area</td> <td>8967 acres</td> </tr> <tr> <td>Existing land use</td> <td>Mangrove forests, sand dunes, water channels, few residents, shrimp cultivation and farmland</td> </tr> <tr> <td>Connectivity</td> <td>Roadway and waterway</td> </tr> </tbody> </table> <p><i>Source: MACE analysis</i></p>	Parameters	Details	Site co-ordinates	2374924.377 N - 2386338.522 N & 380091.306 E - 389270.197 E	Site boundary on East	Settlement- Ghatibanga village	Site boundary on West	Sea	Site boundary on North	Maheshkhali water channel	Site boundary on South	Maheshkhali water channel connecting the sea	Total area	8967 acres	Existing land use	Mangrove forests, sand dunes, water channels, few residents, shrimp cultivation and farmland	Connectivity
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Total area	8967 acres																	
Existing land use	Mangrove forests, sand dunes, water channels, few residents, shrimp cultivation and farmland																	
Connectivity	Roadway and waterway																	
On & off-site features – natural	<p>➔ <b>Mangrove forest</b></p> <ul style="list-style-type: none"> <li>Mangroves are the dominant vegetation of Sonadia Island, which covers about 43.6% of the total study area;</li> <li>It provides an excellent wintering ground for migratory waterfowl &amp; shorebirds and acts as nursing and feeding ground for fish and shrimp species;</li> <li>Some of the anthropogenic activities are existing within the Island including conversion of mangrove forest to shrimp farm and salt pan, illegal logging, and buffalo grazing results in a detrimental effect on the nature of the Island;</li> <li>The project aims to develop SE-TP, considering the conservation of Mangroves and other dependent creatures. To protect the natural</li> </ul>																	

features and attractiveness of Sonadia Island, it is planned to conserve the Mangrove forest as such without disturbing the bio-diversities, and it also helps to suppress the existing unauthorised activities within the Island.

### ➔ Water channels

- Maheshkhali water channel is running immediately adjacent to the Sonadia Island on its East, South and North side and the branches of the channel occupy a major part of Sonadia Island which is about 21.9% of the total study area;
- It connects the Bay of Bengal on the West, thus providing a better water route to roam around the Island;
- This may provide an opportunity to overview the Island in a single water trip;
- Water channels with mangrove forests on either side create a scenic perspective, attention and attraction to the tourists. Refer to [Exhibit No. 8.1](#) depicting existing water channels within Sonadia Island.

Exhibit No. 8.1: Existing water channels



*Source: MACE analysis*

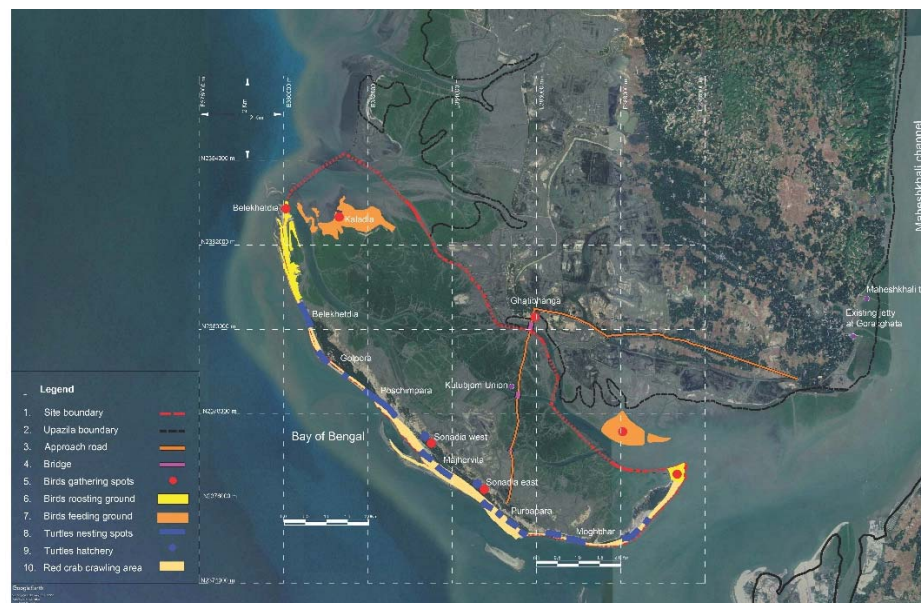
- From the environmental and sustainable aspect, the water channels have been conserved, maintained and retained as such;
- Planning of SE-TP has been synchronised and well-integrated with the existing water channels.

## ➤ Bio-diversity - turtles, horseshoe crabs, birds, red crabs and sea snakes

- Sonadia Island is known as sea turtle's breeding ground, and the turtles breeding hatcheries are developed in and around its shoreline;
- Various species of turtles are available among which Olive Ridley is the most common species, and the nesting spots of turtles are seen along the shore;
- A very rare species of crab named "Horseshoe crab (Scientific name - *Carsinoscorpius rotundicauda*)" is a species with the high immune system and its blood can be used to treat cancer. Their existence can be seen along the coastal area of Sonadia Island;
- Scrambling of Red Crabs on the sand dunes is a unique beauty of Sonadia Island;
- Red crabs are one of the distinct and rare species of Bangladesh and engrave its own beauty integrated with the blue sea;
- Being in the sea, various exotic species are observed within the Island namely: Sand Plovers, Little Stints, Fantail Snipes, Avocet-Sandpipers, Grey Plovers, Black-Bellied Terns, Geese, Herring Gulls, Grey Herons, Cattle Egrets and Yellow Bitterns, rare Turtle species, Seashells and Windowpane Oysters. The various plant species within the Island are *Sonneratia Apetale*, *Acanthus llicifolius*, *Avicennia officinalis* and thick leafed & colo-flowered Ipomoea.

Refer [Exhibit No. 8.2](#) depicting the natural features map showing the location of sensitive areas such as bird's feeding and roosting ground, turtle's nesting spots & hatcheries and red crab's crawling area along the seashore. The enlarged version of the drawing is provided in [Appendix- Drawings](#).

Exhibit No. 8.2: Natural features map



Source: MACE analysis



<p>On &amp; off-site features – infrastructure</p>	<ul style="list-style-type: none"> <li>➔ <b>Power</b> <ul style="list-style-type: none"> <li>○ 33/11 kV Kiranthuli sub-station of 10 mVA capacity falls within Maheshkhali Upazila (<i>Source: REB</i>), and</li> <li>○ From the discussion had with the REB officials, it is understood that Kiranthuli sub-station can be upgraded and utilised to meet the power demand of SE-TP.</li> </ul> </li> <li>➔ <b>Water</b> <ul style="list-style-type: none"> <li>○ <b>Surface water</b> <ul style="list-style-type: none"> <li>● The proposed study area falls adjacent to the Bay of Bengal and the Maheshkhali water channel which is having saline water and shall not be relied upon as a source of water for SE-TP;</li> <li>● There is no other freshwater source of potable quality in the vicinity of the proposed study area.</li> </ul> </li> <li>○ <b>Groundwater</b> <ul style="list-style-type: none"> <li>● There are three (3) number of boreholes within the proposed study area with a maximum depth of about 1000 ft. wherein the quality of groundwater is non-potable; and</li> <li>● The officials of DPHE suggested installing a desalination plant to meet the ultimate water demand of SE-TP and also suggest that the groundwater quality in Gorakghata area is potable and is in good quality which can be relied upon to meet the initial water demand of SE-TP.</li> </ul> </li> </ul> </li> <li>➔ <b>Solid waste management</b> <ul style="list-style-type: none"> <li>○ There is a proposed solid waste dumping yard by CoxDA in the vicinity of the Sonadia Island which can be utilised to treat the solid waste from SE-TP.</li> </ul> </li> </ul>
<p>On &amp; off-site features – transportation</p>	<ul style="list-style-type: none"> <li>➔ <b>Waterway</b> <ul style="list-style-type: none"> <li>○ Maheshkhali - Cox's Bazar boat line connects the jetties of Maheshkhali - Gorokghata Ghat, Adinath Ghat with Kastura Ghat of Cox's Bazar;</li> <li>○ The Southern tip of the Island is 8 km from Kastura Ghat, 8.5 km from Maheshkhali - Gorakghata Ghat and 9.5 km from the jetty at Maheshkhali – Adinath;</li> <li>○ The jetty facilities at these Ghats can be integrated with the proposed jetty facility at Sonadia Island;</li> <li>○ The location of Ghats and waterway is depicted in <a href="#">Exhibit No. 8.3</a>.</li> </ul> </li> </ul>



Source: MACE analysis

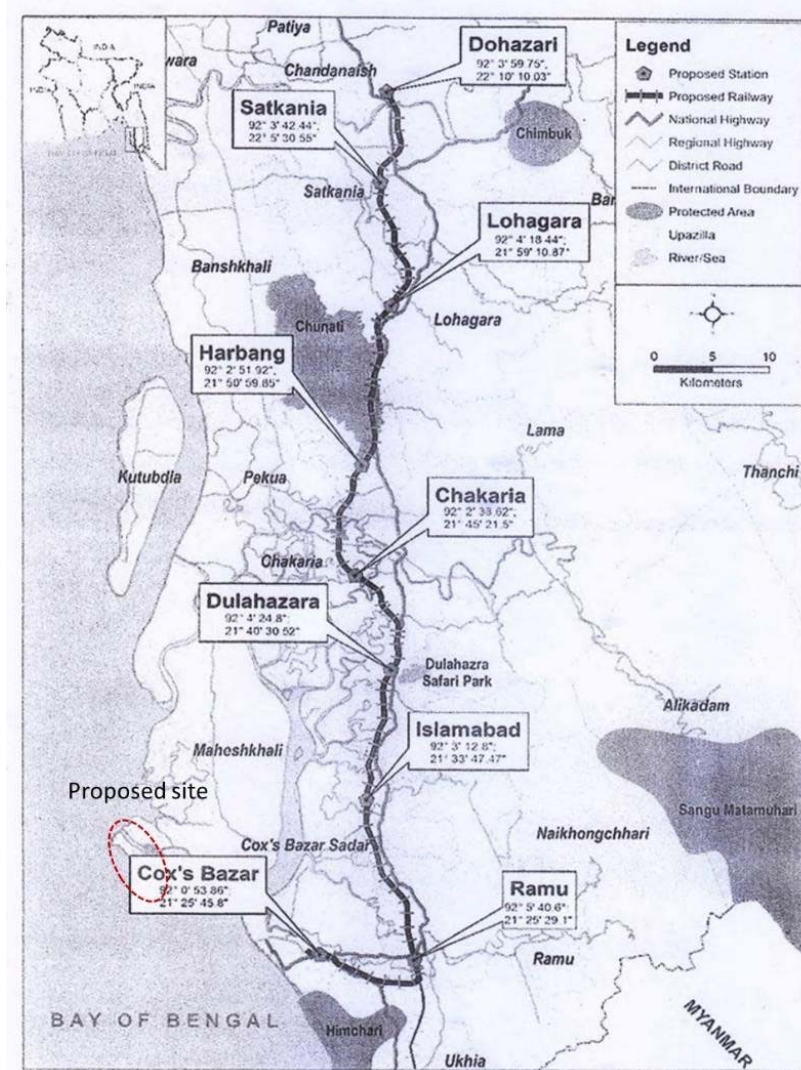
➔ Roadway

- An approach road of width varies between 9 to 10 ft. runs along the Kutubjom Union and connects the site with Zila road (Z1004) at a distance of 11.5 km from the study area which continues and runs within the proposed study area;
- This approach road is a mud road, and its width is less than 9 ft. at some stretches;
- This approach road has been well integrated with the proposed internal road network of SE-TP while planning;
- Dhaka-Chittagong National Highway (N1) is one of the strategic highways in Bangladesh, and the proposed site is about 52 km from the highway, which can be reached through Zila road (Z1004) via existing village road.

➔ Railway

- At present, there is no railway line connecting Sonadia, but there is a railway network under construction which connects Cox's Bazar with Chittagong;
- There is a railway station under construction at Cox's Bazar which can be reached through a combination of waterway and roadway;
- The distance is about 18 km from the site via. combination of waterway & roadway;
- The railway line starts from Dohazari in the North of Chittagong Division and runs towards South to reach the Cox's Bazar District;
- [Exhibit No. 8.4](#) shows the proposed railway network of Chittagong Division.

Exhibit No. 8.4: Proposed railway network of Chittagong division



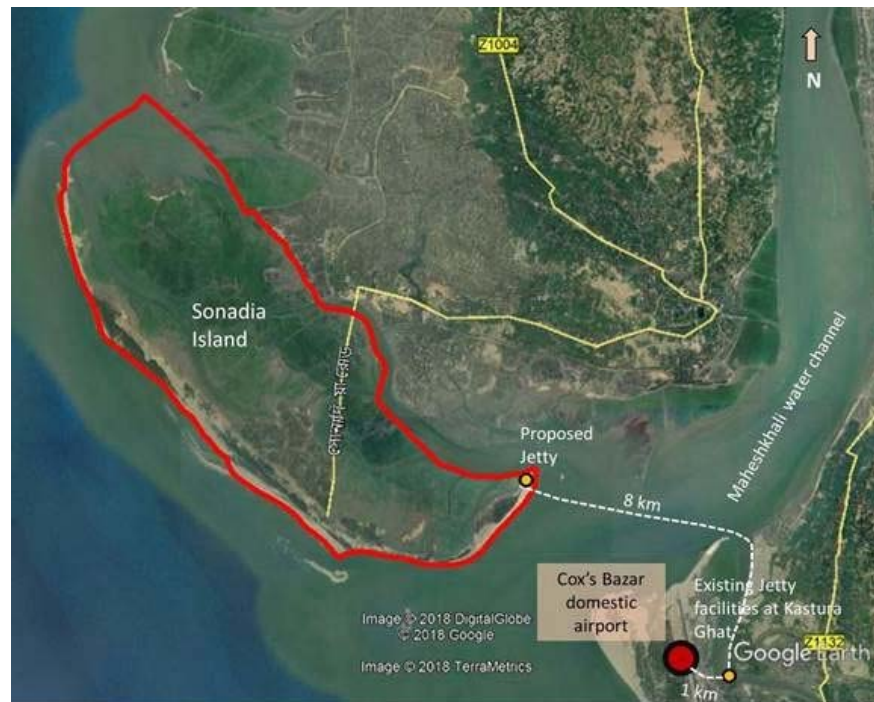
**Source:** Department of Railway, Bangladesh - Dohazari-Cox's Bazar railway project wing

**Note:** This map is a generalised illustration only and is not intended to be used for reference purposes. The representation of political boundaries and the names of geographical features do not necessarily reflect the position of the Government of Bangladesh (GoB) or Government of neighbouring countries on international issues of recognition, sovereignty, jurisdiction or nomenclature.

#### ➔ Air connectivity

- Cox's Bazar airport is the nearest airport to reach Sonadia Island and is at a distance of about 9 km through the waterway and 110 km through roadway;
- Airport terminal building is undergoing an extension to cater for international flights.
- [Exhibit No. 8.5](#) shows the location of the airport and its' connectivity.

Exhibit No. 8.5: Location of the airport and its' connectivity



Source: MACE analysis

On & off-site  
features  
–  
others

#### ➤ Settlements

- Apart from animals, aquatic and plant species, human beings are also the habitats of Sonadia Island;
- The Island accommodates two villages, namely Sonadia East and Sonadia West and there are totally 315 households within the Island (as per Inventory of Losses (IoL) survey);
- The means of occupation of people are catching fish, shrimp cultivation, fish drying activities, etc.;
- The unauthorised shrimp cultivation activities are existing within the Island which will be suppressed upon developing SE-TP;
- BEZA planned to rehabilitate the settlements to other land parcels of Sonadia Island;
- Also, there is a school for the residents situated inside the proposed study area;
- It is recommended that while relocating the people, necessary social infrastructure and basic amenities shall be planned;
- The location of human settlements and the proposed site for the rehabilitation of evacuated households are depicted in [Exhibit No. 8.6](#).

Exhibit No. 8.6: Location of human settlements



Source: DevCon analysis

➔ Tourism spots

- Various scenic tourist attractions are in the vicinity of the proposed study area such as Cox’s Bazar sea beach, Adinath temple, hilly mountains running parallel to the beach etc.;
- The location of existing tourists’ spots/potentials in the vicinity of the proposed study area is shown in [Exhibit No. 8.7](#).

Exhibit No. 8.7: Tourism spots/potentials in the vicinity of the proposed study area

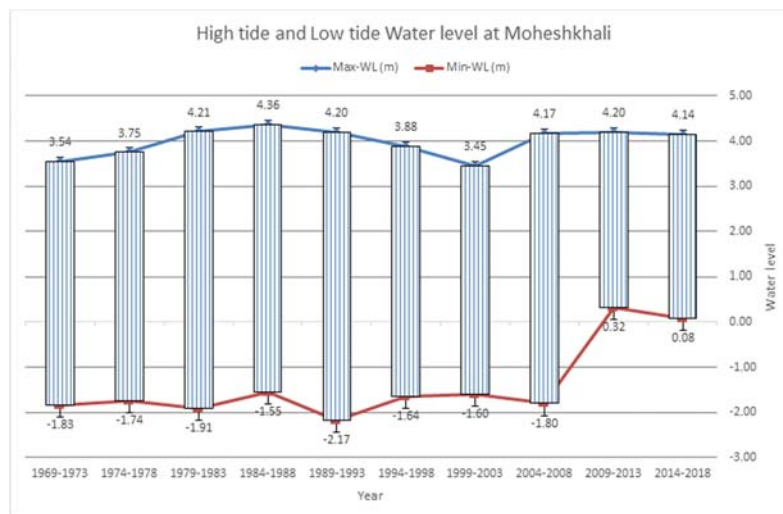


Source: MACE analysis

Level of tidal variation in Maheshkhali water channel

The maximum water level during high tide is +4.36 m, and the minimum water level during low tide is -2.17 m. Based on this, the embankment level has been finalised and is recommended to be considered while planning the finished ground level of structures during the detailed engineering stage.

Exhibit No. 8.8: Tidal chart recorded near Sonadia Island



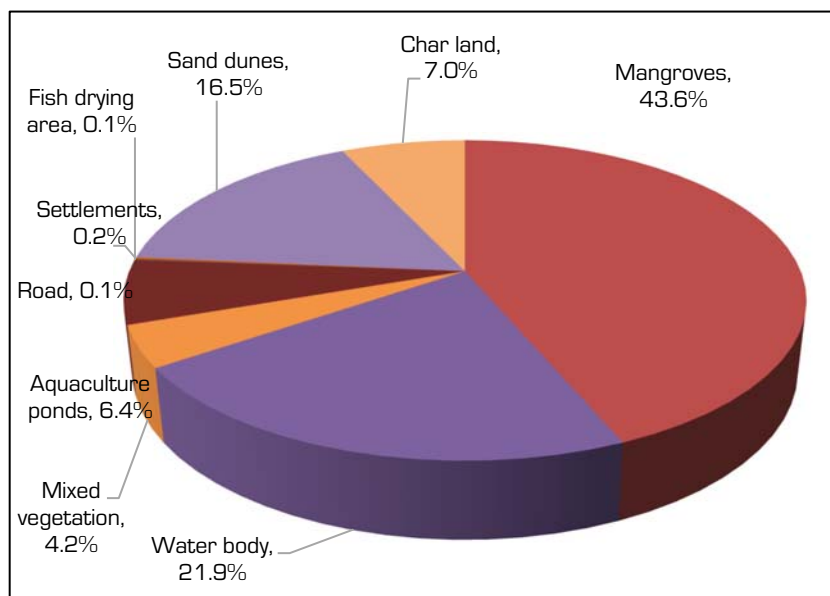
*Note:* Based on 50 years of data (1969-2018)

*Source:* BWDB

Existing land use of Sonadia Island

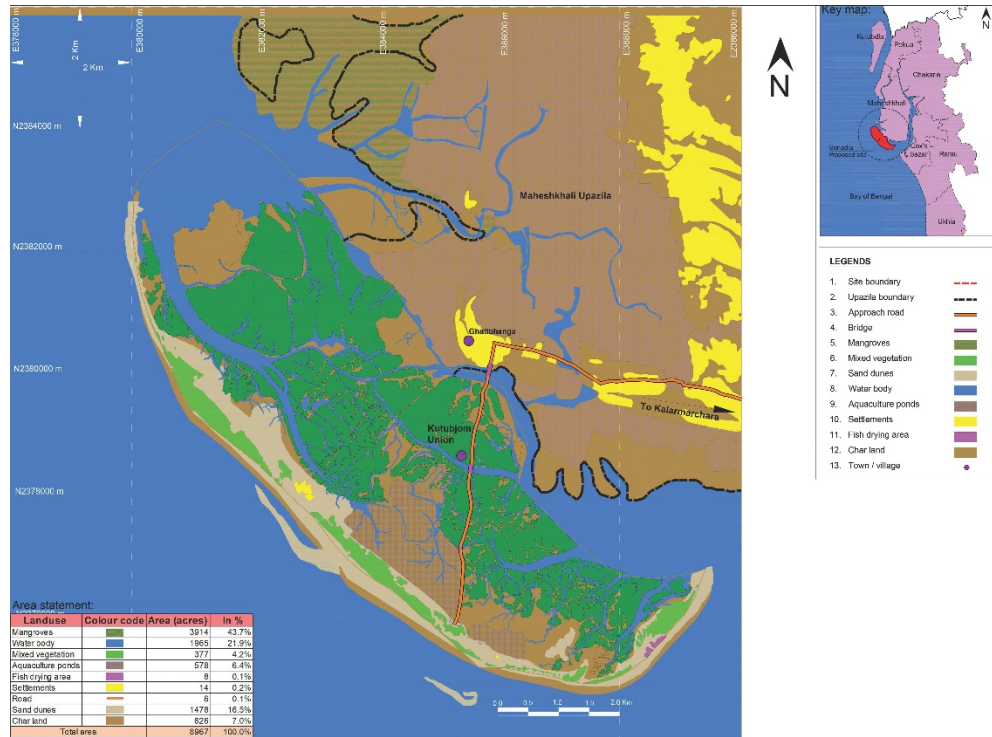
The major land use cover within the proposed study area is Mangroves, which constitutes 43.6% of the total study area, followed by water body, which constitutes 21.9%. The other minimal land use cover within the study area are aquaculture ponds, char land, fish drying area, mixed vegetation, road, sand dunes and settlements. The land use map of Sonadia Island is depicted in [Exhibit No. 8.10](#), and the enlarged version of the drawing is provided in [Appendix - Drawings](#).

Exhibit No. 8.9: Land use pattern of Sonadia Island



*Source:* MACE analysis

Exhibit No. 8.10: Existing land use map of Sonadia Island



Source: MACE analysis

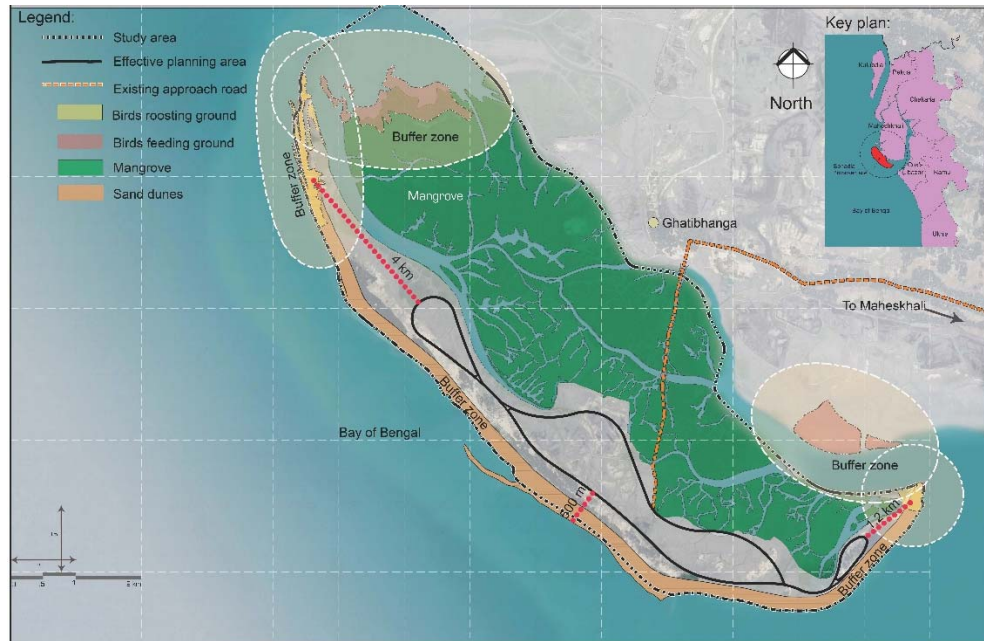
Delineation of the effective planning area

From the overall study area of 8967 acres, effective planning area of 909.4 acres has been delineated based on outcomes from analysis of existing features, identified issues and constraints. Refer [Exhibit No. 8.12](#) depicting delineated effective planning area, and the enlarged version of the drawing is provided in [Appendix- Drawings](#).

Exhibit No. 8.11: Considerations for delineating the effective planning area

- Protecting the natural mangroves
- Retaining of birds nesting & feeding ground with suitable buffer
- Not disturbing the seashore (Turtles nesting and Red Crab crawling area)
- Not disturbing the existing water channels
- Not disturbing the existing natural wind barriers
- Unauthorised shrimp cultivation area and existing settlement area can be utilised with resettlement proposal
- Not disturbing the Char land/mud flat which acts as feeding & survival ground for various species of the Island

Exhibit No. 8.12: The delineated effective planning area for SE-TP



Source: MACE analysis

The further details on site settings are discussed separately in [Annexure 8A - Site analysis](#) and [Annexure 14A to 14G - Environment and social review](#).

The geotechnical investigation of the study area is enclosed as [Appendix -1](#).



## Chapter – 9

# Transportation plan

### 9.1. The preamble of developing a transportation plan

At present, Bangladesh is passing through a stage of rapid economic development (GDP growth of more than 7%), and BEZA is developing several EZs in Chittagong – Cox's Bazar area which will eventually attract a lot of foreign investors for whom recreation facilities need to be developed. Moreover, the number of tourists (both domestic and foreign) is growing faster (annual growth rate of 20%), which necessitate the development of facilities. To cater to the increase in the number of tourists, the required level of transport facilities needs to be provided for the tourists.

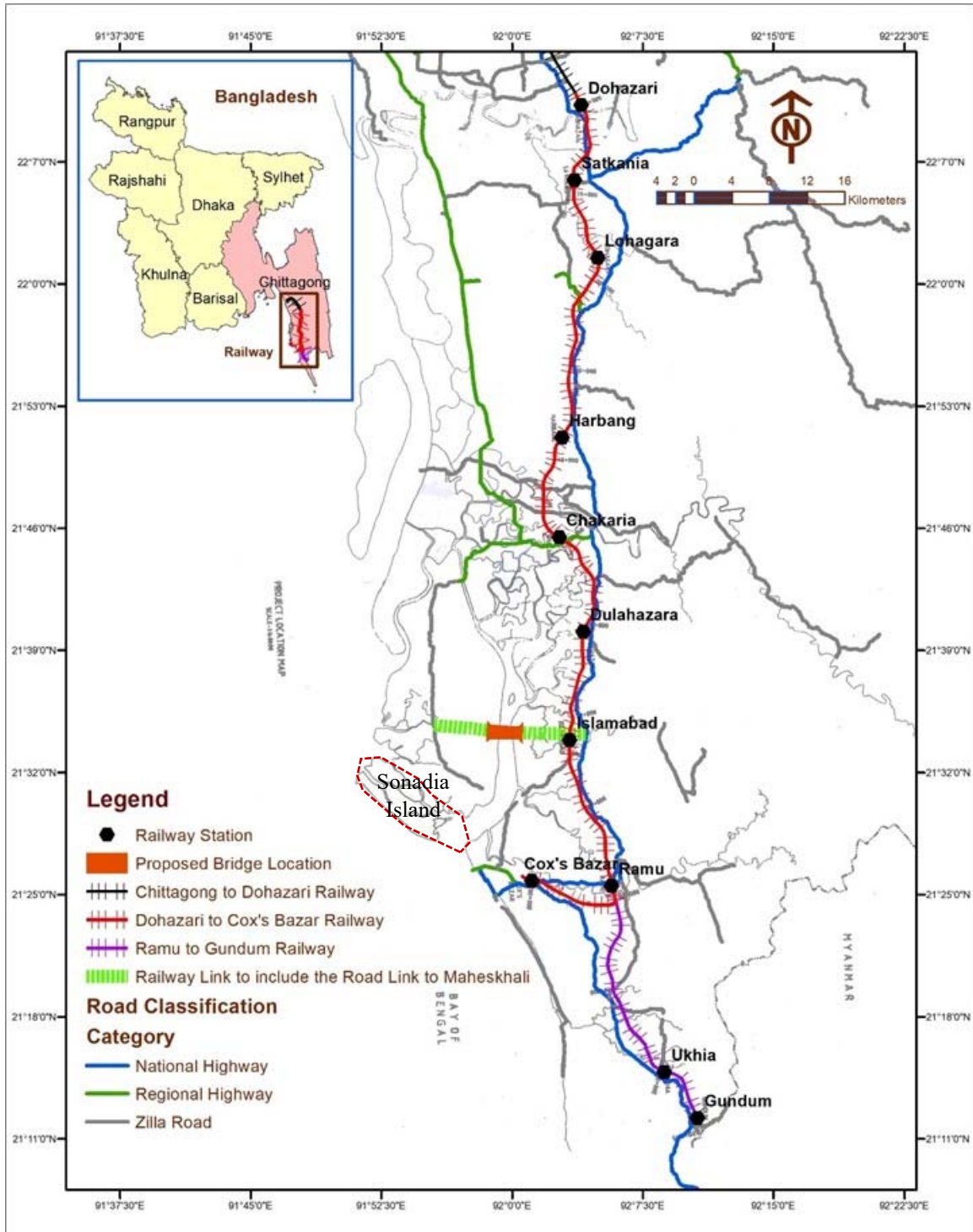
The site is located 9 km northwest of Cox's Bazar International airport, which can be reached by crossing Maheshkhali water channel from Cox's Bazar Kastura Ghat. Also, the project site can be accessed through roadway from Cox's Bazar via Chittagong Cox's Bazar highway and Zila road of Maheshkhali Island, but the distance of travel will be much longer for the tourists (110 km). Hence, with the aim of providing a short distant comfortable journey for the tourists, different modal connectivity has been proposed in transportation plan for the easy movement of tourists between Cox's Bazar and Sonadia Island. There are two temples (Adinath Mandir and Sorno Mandir) at Maheshkhali which attracts both domestic and international tourists. Japan International Co-operation Agency (JICA) is currently preparing an integrated master plan for Maheshkhali, which may trigger huge economic development.

**Annexure-9A** provides the objectives and methodology of the transportation plan, including data collection.

### 9.2. Connectivity of Cox's Bazar and connectivity between Cox's Bazar and Sonadia Island

The study analysed Cox's Bazar connectivity in terms of connectivity between neighbouring countries with Cox's Bazar, connectivity between major cities of Bangladesh with Cox's Bazar, and connectivity between Cox's Bazar and Sonadia Island. The connectivity of the Cox's Bazar through various modes from major cities of Bangladesh is also analysed. The present situation on Cox's Bazar connectivity is discussed at length and provided in **Annexure-9A**.

Considering the potentials of Maheshkhali Island such as economic developments by JICA, EZs by BEZA, SE-TP etc., apart from existing waterway connectivity and proposed jetty, there is a requirement for the development of bridge over Maheshkhali channel connecting the mainland with the proposed railway line and highway N1 (connecting Chittagong with Cox's Bazar). The tentative alignment of the proposed connectivity with the bridge is depicted in **Exhibit No. 9.1**. While proposing the alignment, the factors such as the shortest crossing distance of Maheshkhali water channel and connectivity to be established with the proposed railway line have been considered. Accordingly, an alignment connecting the Zila road (Z1004 which connects the study area through approach road for a distance of about 11.5 km) of Maheshkhali Island with the Highway N1 and proposed Islamabad railway station is depicted in **Exhibit No. 9.1**.



Source: DevCon analysis

Note: This map is a generalised illustration only and is not intended to be used for reference purposes. The representation of political boundaries and the names of geographical features do not necessarily reflect the position of the GoB or Government of neighbouring countries on international issues of recognition, sovereignty, jurisdiction or nomenclature.

In the present study, a preliminary location is proposed, which needs to be studied in detail. Hence a detailed feasibility study for a bridge link may be initiated.

The proposed railway line has not been directly linked to Sonadia Island, and it can be reached through approach road and Zila road of Maheshkhali Island. This has been proposed considering the possible environmental impact such as noise and vibration due to train movements which may affect the sensitive bio-diversities of Sonadia Island.

From Maheshkhali Island, it is suggested that the tourists can use the battery-operated vehicle to reach Sonadia Island. There are 2 number of jetties proposed-one at Sonadia Island and one at Cox's Bazar to exclusively facilitate the tourist's movement to Sonadia Island through waterway from Cox's Bazar.

### 9.3. Transport network within Sonadia Island

Based on the land use plan, an embankment cum spinal road of 7.5 m wide running for a length of about 17.9 km has been proposed linking the proposed jetty at the Southern tip of Sonadia Island. This spinal road is proposed to be connected with the footpaths/internal driveway for NMT vehicles. Provision for cycle tracks and pedestrian path

have been proposed parallel to the main trunk road. Only NMT and small battery-operated cars will be allowed inside SE-TP. Adequate cross drainage provision shall be proposed for the road embankment to avoid waterlogging. The circular waterway route is proposed along the existing channel with a beautiful view of mangroves on either side, which will act as an attractive phenomenon of the Island. Few boat landing stations have also been suggested to be proposed along the route. Minor dredging has been suggested to be proposed at essential locations to ensure navigability. Existing road network connecting Maheshkhali Island is a narrow mud road and is recommended to upgrade and carry out some improvements on the connecting road. A transition parking area has been suggested at Maheshkhali end from where the eco-friendly vehicles will be allowed to enter the Sonadia Island.

### 9.4. Transport network with adjacent tourist spots

There are several tourist spots (Maheshkhali) adjacent to Sonadia Island, and it is expected that tourist operators will develop alternate tour packages connecting these spots. BEZA is also developing Naf tourist park and Sabrang tourist park which are about 100 km south of Cox's Bazar. The connectivity of these spots is studied, and **Table No. 9.1** summarises the distance to the tourist spots.

**Table No. 9.1: Distance to adjacent tourist spots**

Link	Transport mode	Distance (km)	Time of journey (hr)*
Cox's Bazar to Sonadia	Water transport	8	1.00
Cox's Bazar to Maheshkhali	Water transport	10	1.20
Cox's Bazar to Naf	Road transport	50	2.00
Cox's Bazar to Sabrang	Road transport	75	2.50
Cox's Bazar to St. Martins Island	Road/water transport	90+17	3.50+ 2.00

\* one way

*Source: DevCon analysis*

From **Table No. 9.1**, it is observed that within 1 to 5 hours of journey, various tourists' spots can be reached from the proposed SE-TP.

## 9.5. Transport infrastructure

The status of road communication on Dhaka-Chittagong-Cox's Bazar-Teknaf Corridor, upgrading and construction of new transport infrastructure, upgrading and construction of new transport infrastructure are discussed at length and provided in **Annexure-9A**.

### 9.5.1. Status of road communication on Dhaka-Chittagong-Cox's Bazar-Teknaf Corridor

Based on the analysis of the traffic volume and modal share on Chittagong-Cox's Bazar highway, the following inferences have been drawn.

- The daily traffic (considering both directions) is about 12000 vehicles per day;
- The peak hourly traffic in each direction is about 700 vehicles per hour;
- The freight traffic is predominant since it is a major transport corridor to Chittagong port which caters for more than eighty per cent of the nation's trade;
- The existing traffic volume in equivalent Passenger Car Unit (PCU) based on the modal share capacity is about 2900 (considering both directions) whereas the designed capacity of this road is about 2100 PCU per hour which shows that the road capacity has exceeded the saturation point and it needs up-gradation;
- The average speed is about 20 km per hour which is due to the mixed nature of traffic and absence of service lane; and
- It is suggested to make necessary arrangements to upgrade the highway immediately.

Given the current growth rate of traffic (about 8% per annum) the capacity of the upgraded four-lane highway is expected to be exhausted by 2030. There will be additional traffic generated from Maheshkhali EZs and SE-TP. At

that point in time, a six-lane expressway will be required. Once the Chittagong to Cox's Bazar railway link starts to operate, there will be a lot of intermodal diversion/shifting from road to railway especially passenger movement; and this may extend the capacity of the N1 highway by few more years.

### 9.5.2. Upgrading and construction of new transport infrastructure

Chittagong-Cox's Bazar railway line is under construction. The process of expansion of Chittagong-Cox's Bazar highway to 4-lane from 2 lanes has already commenced, and expansion work of the Cox's Bazar airport terminal building and the runway is under progress. Development of 2/3<sup>rd</sup> portion of Cox's Bazar -Teknaf marine drive was completed, and the remaining stretch will be developed in future. In the meanwhile, N1 highway (Cox's Bazar to Teknaf) (very much congested) will be used. The existing road link from Chittagong to Maheshkhali needs up-gradation. The roads within Cox's Bazar city serving the tourist population needs resurfacing. Two existing jetties at Maheshkhali are adequate at present; however, two more jetties are required to serve tourists of Sonadia Island. One at Sonadia Island and one more at Cox's Bazar exclusively for the use of tourists visiting Sonadia Island. The embankment road, cycle track, sidewalk and internal driveways will also be developed as part of the master plan.

### 9.5.3. Road access to Sonadia Island from Chittagong- Cox's Bazar highway

During inclement weather (when the sea is very rough) travel by boat becomes risky. Since the waterway transport cannot be relied upon all the time and to benefit the frequent users from Cox's Bazar, it is proposed to construct a bridge connecting Chittagong-Cox's Bazar highway with Zila road (Z1004) of Maheshkhali Island to reach it in the shorter distance through the roadway. In order to avoid the disturbances on sensitive bio-diversities of Sonadia Island, due to traffic movement, it is planned not to propose the bridge connecting the Sonadia Island directly from Cox's Bazar. The tentative alignment of proposed bridge connectivity of Maheshkhali Island from Chittagong-Cox's Bazar highway is depicted in

**Exhibit No. 9.2.** The connectivity requires the construction of the bridge for a length of about 3 km with 0.5 km viaduct on both sides and approach road for a length of about 15 km. The total distance to reach the proposed site from the highway via proposed road cum railway bridge is about 32 km. This proposal helps to reduce the travel distance from 110 km to 32 km, which will

help the Cox's Bazar tourists' visitors to access Sonadia Island easily. It will also benefit the frequent commuters between Cox's Bazar & Maheshkhali and proposed economic developments & industries at Maheshkhali. The proposed road connectivity is suggested to be extended till the proposed railway line connecting Islamabad station as depicted in **Exhibit No. 9.2.**

**Exhibit No. 9.2: Proposed connectivity between Maheshkhali Island and highway (N1)**



*Source: DevCon analysis*

#### 9.5.4. The road network within Cox's Bazar city to facilitate tourist movement

The study includes a review of the important transport links, existing road condition, and transport cost (per vehicle) for major roads within Cox's Bazar city and details are provided in **Annexure-9A.**

Based on the analysis, it is observed that the existing major roads within Cox's Bazar connecting bus terminals, proposed railway station, airport and existing jetties which are handling the tourist's movement are in good

condition. Hence, the tourists from various modes reaching Cox's Bazar can easily and comfortably reach the jetty and can commute to the Sonadia Island through the waterway, or they can reach the site through Highway (N1) and a proposed bridge connecting highway and Zila road of Maheshkhali Island.

#### 9.6. Zone of influence of Cox's Bazar tourism corridor

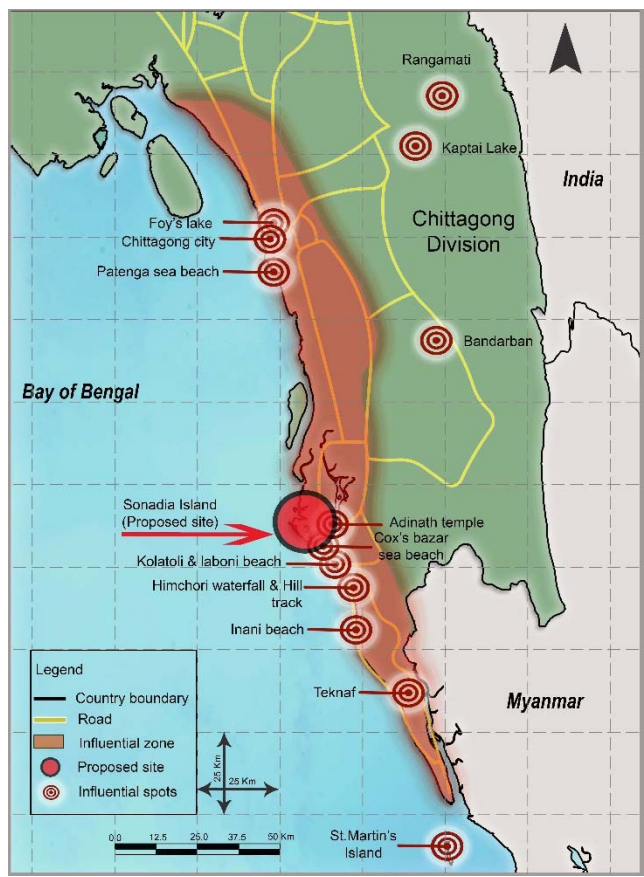
The area of influence for Sonadia and Cox's Bazar tourist corridor is discussed at length and provided in **Annexure-9A.**

The entire tourists' spots within the Division have not been included in the zone of influence of Cox's Bazar & proposed SE-TP because it will take a long time to reach the spots. The tourist spots which are considered for demarcation of an influential zone is based on the reasonable tourists' packages considering access, and time of travel. For packaging of tourist spots on Cox' Bazar corridor, the places such as

Maheshkhali, Sonadia, Cox's Bazar, Teknaf, St. Martin Island, Sabrang and Chittagong are included.

Refer **Exhibit No. 9.3** depicting the zone of influence and tourists' spots in the region, and the enlarged version of the drawing is provided in **Appendix- Drawings**.

**Exhibit No. 9.3: Influential zone and tourists spots in the region**



*Source: MACE analysis*

**Note:** This map is a generalised illustration only and is not intended to be used for reference purposes. The representation of political boundaries and the names of geographical features do not necessarily reflect the position of the GoB or Government of neighbouring countries on international issues of recognition, sovereignty, jurisdiction or nomenclature.

According to the findings of a tourist survey, it is found that about 96% spends less than 5 days in Cox's Bazar, 1% spends 5-10 days,

and 2% spends more than 10 days. The proposed tourist packages are provided in **Table No. 9.2**.

**Table No. 9.2: Proposed tour packages**

Duration of stay	Locations of visit	Travel time* (hr)
3 days	Cox's Bazar, Sonadia	3-4
5 days	Cox's Bazar, Sonadia, Maheshkhali	4-5

Duration of stay	Locations of visit	Travel time* (hr)
7 days	Cox's Bazar, Sonadia, Maheshkhali, Teknaf/ Sabrang	15-17
10 days or more	Cox's Bazar, Sonadia, Maheshkhali, Teknaf/St. Martin/Sabrang	22-25

*+It has been assumed that tourists will fly in and fly (arrive and depart) out from Cox's Bazar; \* Does not include time spent within tourist spots*

**Source:** DevCon analysis

The tourist's package infers that since 96% of tourists have shown interest to spend at least 5 days, they can very well visit Cox's Bazar, Sonadia Island and Maheshkhali together.

### 9.7. Estimation of tourists for Cox's Bazar for transportation planning

Based on the discussion had with the TOAC, comprising of tour operators and bus operators at the two bus terminals of Cox's Bazar, the daily tourist visitors have arrived and is presented in [Annexure-9A](#).

Considering the aggressive scenario, it is found that the expected number of tourists to Sonadia Island for the projected year 2050 will be 5.57 million. Accordingly per month visitors to Sonadia Island will be 4,64,166, and per day visitors will be 15,472.

However, based on the field survey 2019, and discussion had with the tour operators and bus operators at the two bus terminals of Cox's Bazar, it is observed that the total number of tourists visiting Cox's Bazar per day during festival season and school holidays (considered as peak season) is 1,50,000.

The projected value of the expected number of tourists to Sonadia Island for the year 2050 is 15,472, which is only 10.3% of existing Cox's Bazar tourists footfall value of 1,50,000. This may be due to the inclusion of refugees in tourist's data of Cox's Bazar. Hence, it cannot be compared, and the projected data have been considered for planning.

### 9.8. Transport facilities

#### 9.8.1. Transport facilities from Dhaka to Cox's Bazar corridor

The tourist survey reveals that about 25% of tourists come from the area around Chittagong

whereas 75% of tourists come from Dhaka region and passing through Dhaka city. The main movement of tourists travels through Dhaka-Chittagong-Cox's Bazar transport corridor. The tourist survey also reveals that currently, about 85% of tourists use the bus and the remaining 15% use air transport, car, and vans.

There are currently 10 flights operating on the Dhaka-Cox's Bazar route carrying about 700 passengers, and it is assumed that 50% would be tourist passenger (during non-peak 30% and during peak 70%).

There is currently no railway link, the new railway link is expected to be opened in 2023; and will carry about 5000 passengers if eight trains operate daily (which is currently the case for Dhaka to Chittagong railway operation).

The number of buses required daily varies between 800 to 2400 (during peak season more private and rented cars are used).

The airport at Cox's Bazar is undergoing expansion (both runway and terminal building), and within 2023 the number of flights and the wide-bodied carrier will substantially increase the capacity.

The modal share of road traffic in the region will be of 70 to 80 per cent. Chittagong-Cox's Bazar road will be made four lanes by the year 2025 to increase the traffic carrying capacity. Discussion with the Japanese government and Bangladesh is ongoing for the development of this highway on a PPP basis. Considering the future proposals in Cox's Bazar region, it is suggested to upgrade it further to six-lane.

*9.8.2. Transport need of the people accommodated in the resettlement area*

About 1762 project-affected people will be resettled at the location proposed by BEZA. Some of these people may be working in the proposed SE-TP, who needs daily commutation. Hence, cycle track and footpath connectivity will adhere to the movement of the people. Some of the resettled people may need to visit Maheshkhali for a job or for business or to access the markets. Hence, the transport connectivity to Maheshkhali needs to adhere to the people required. Only NMT or battery-operated small vehicle will be allowed to provide service to the passengers.

*9.8.3. Transportation between Cox's Bazar and Sonadia Island*

The tourists reaching Cox's Bazar through highway, proposed railway line and airway have to use the waterway to reach the proposed SE-TP. An alternative way of reaching SE-TP is through the proposed road and railway connectivity over the bridge crossing Maheshkhali channel which connects the Chittagong-Cox's Bazar highway and proposed railway line with Maheshkhali Zila road.

Comparatively, the waterway will be the preferable mode for tourists than roadway since it covers the shortest distance and curiosity to travel through speed boats for the tourists will be more. The total expected tourists to SE-TP in 2050 is about 15,472 per day based on projected tourists. It is assumed that 60% of tourists will be accessing SE-TP through waterway from Cox's Bazar and the remaining 40% of tourists will be reached either through a roadway or proposed railway.

In case of the roadway, they can reach directly from Chittagong either by a combination of Chittagong-Cox's Bazar highway and regional highway or Chittagong-Cox's Bazar highway with proposed road alignment over the proposed bridge connecting Chittagong-Cox's Bazar highway with Maheshkhali Zila road. The tourists coming through the proposed railway line can reach SE-TP through the same.

It is assumed that entry to SE-TP is scheduled between 8 AM to 1 PM (for 5 hours). The entire expected 15,472 tourists will not be entering SE-TP and utilising the transport facility at the same time. It is assumed that 60% of tourists (9300) will be using speed boat to reach SE-TP from Cox's Bazar side and remaining 40% of tourists (6200) coming from Maheshkhali side via approach road will be reaching SE-TP through battery car.

➔ **Calculation of battery car requirement**

The assumption on the distance to travel, the capacity of battery car, the number of persons per batch, number of batches and the number of maximum trips per car is shown in **Annexure-9A**.

Based on the analysis, it is observed that to handle the total number of incoming tourists to SE-TP from Maheshkhali side; there are totally 5 trips required per set of cars with totally 2 sets of battery cars with 78 cars in each set and totally 155 cars making totally 10 trips by both sets. The required number of battery car in each set has been calculated based on the above schedule and assumptions to facilitate the tourists to reach SE-TP. The estimated number of cars and assumptions are given in **Table No. 9.3**.

**Table No. 9.3: Estimation of battery car requirement**

Number of tourists	6200
Capacity of car	8
Number of required trips	775
Total number of trips by each set	5
Total number of required cars per set	78
Total number of required cars	155
Number of required parking	155

*Source: DevCon analysis*

However, if there are any deviations from the assumption such as a greater number of tourists in future are coming from Maheshkhali side rather than Cox's Bazar side, the number of facilities has to be increased accordingly.



### ➤ Calculation of speed boat requirement

The assumption on the distance to travel, the capacity of a speed boat, number of persons per batch, number of batches and the number of maximum trips per boat is shown in **Annexure-9A**.

Based on the analysis, it is observed that to handle the total number of incoming tourists to SE-TP from Cox's Bazar side, and there are totally 3 trips required per set of speed boat with totally 2 sets of speed boats with 16-speed boats in each set and totally 32 boats making totally 6 trips by both sets. The required number of speed boat in each set has been calculated based on the above schedule and assumptions, to facilitate the tourists to reach SE-TP. The estimated number of speed boats and assumptions are given in **Table No. 9.4**.

**Table No. 9.4: Speed boats to reach SE-TP**

Number of tourists	9300
The capacity of speed boat	100
Number of required trips	93
Total number of trips by each set	3
Total number of required boats per set	16

**Table No. 9.5: Type of road within Sonadia Island**

Road type	Width (m)	Length (m)	Mode of transport
Connecting road to the Island to be upgraded	10	3500	The electric car, bicycle, walking
Proposed embankment road	7.5	17940	The electric car, bicycle, walking
Connecting driveways between zones	7.5	4672	Bicycle, walking
Internal NMT driveway/pathway within the zone	5.5	41248	Walking
Access to the resettlement area	5.5	2000	Walking, bicycle

*Source: DevCon analysis*

### ➤ Provision of transport facilities within Sonadia Island

Within Sonadia Island, the transport mode will be through walking, cycling, electric car riding and boat riding in the defined channel. The comfortable and eco-friendly transportation

Total number of required speed boat	32
Number of anchoring facilities required at the jetty	16 at Cox's Bazar side (set A) and 16 at Sonadia side (set B)

*Source: DevCon analysis*

However, if there are any deviations from the assumption such as a greater number of tourists in future are coming from Cox's Bazar side rather than Maheshkhali side, the number of facilities has to be increased accordingly.

#### 9.8.4. Proposed road hierarchy and transport facilities within Sonadia Island

##### ➤ Proposed hierarchy of road within Sonadia Island

There are two bridges existing within the study area which connects the Maheshkhali Island with Sonadia Island and planning area. However, there is no well-defined road except mud pathway connecting Maheshkhali with Sonadia Island. This road is proposed to be upgraded to 10 m wide pucca road. The other proposed road categories and mode of transport within Sonadia Island are shown in **Table No. 9.5**.

facilities have to be provided for the projected/expected tourists footfall to Sonadia Island. The consideration of tourist's footfall will be for the ultimate projected the year 2050, which is about 15,472 per day. The estimated modal share and total users' details are provided in **Table No. 9.6**.

**Table No. 9.6: Modal share and total users for internal movement within SE-TP**

Type of mode	% of users	Number of users
Walking	50.0	7736
Cycling	10.0	1547
Battery operated vehicle	26.7	4131
Boat ride	13.3	2058
<b>Total</b>	<b>100.0</b>	<b>15,472</b>

**Assumption:** 10% of tourist will use a bicycle, 20% will use a boat, 50% will use an electric car, and walking will be done for all the mode in some form or other.

**Source:** DevCon analysis

It is assumed that entry to SE-TP is scheduled between 8 AM to 1 PM (for 5 hours). The entire expected 15,472 tourists will not be entering SE-TP and utilising the transport facility at the same time. As scheduled for 5 hours, it is assumed that 3100 tourists will be entering SE-TP in every 1 hour and utilising the transport

facilities proposed within SE-TP. Accordingly, 5 batches will be entering SE-TP as each batch in every 1 hour. The arrived number of users of various modes of transportation for internal movement within SE-TP are provided in **Table No. 9.7**.

**Table No. 9.7: Modal share and batch-wise users for internal movement within SE-TP**

Type of mode	% of users	Number of users per batch
Walking	50.0	1550
Cycling	10.0	310
Battery operated vehicle	26.7	828
Boat ride	13.3	412
<b>Total</b>	<b>100.0</b>	<b>3100</b>

**Assumption:** 10% of tourist will use a bicycle, 20% will use a boat, 50% will use an electric car, and walking will be done for all the mode in some form or other.

**Source:** DevCon analysis

The proposed transport facilities based on projected expected tourists to Sonadia Island for year-2050 are as follows:

- 1) **Bicycle:** Based on analysis from **Table No. 9.7**, it is assumed that 310 persons per batch will be using a bicycle for internal transport. Based on this, a minimum of 310 cycles per batch should be available. Hence, for the entire 5 batch members, minimum 1550 cycles should be available.
- 2) **Boats:** 412 tourists per batch will be using the boat ride proposed in the water

channel. The number of tourists that can travel through water channel depends on the capacity of boats, the number of boats, and frequency of trips. **Table No. 9.8** gives an indication in this regard. Depending on the capacity of boat and frequency, the passenger number will vary between 500 to 2000. The tour operator can choose any one of the options. Even though based on assumption, only 412 tourists per batch will prefer the boat ride, the overcrowding of different batches at the same time can be managed with this proposed package.

Table No. 9.8: Passenger capacity of boats for boat ride route

Interval	Number of boats	Number of trips	50 seat capacity	75 seat capacity	100 seat capacity
15 minutes	8	20	1000	1500	2000
20 minutes	5	15	750	1125	1500
30 minutes	4	10	500	750	1000

Source: DevCon analysis

- 3) **Battery operated cars:** Based on analysis from [Table No. 9.7](#), it is assumed that 828 users per batch (taken as 1000) will be using battery car for internal movement within SE-TP. Accordingly, the estimated number of required battery car and the assumptions considered for the same are given in [Table No. 9.9](#).

Table No. 9.9: Battery car within SE-TP

Number of tourists	1000
Capacity of car	8
Number of required trips	125
Total number of sets	2

Total number of trips by each set	5
Total number of required cars per set	13
Total number of required cars	25
Number of required parking	25

Source: DevCon analysis

In order to facilitate the internal movement of tourist's, sufficient length of the walkway, 310 bicycles for each batch and totally 1500 cycles, 10-speed boats and 25 battery operated cars have been proposed. In case a greater number of tourists are allowed, then the vehicle number can be increased accordingly. The proposed rent and fare details are shown in [Table No. 9.10](#).

Table No. 9.10: Proposed unit transport cost within Sonadia Island

Type of vehicle	Rate per vehicle* (Taka)	Rate per person* (Taka)
Bicycle	20 per 15 minutes	20 per 15 minutes
Batter car (8 seated)	450 per hour	50 per hour
Boat (10 seated capacity)	2000 per hour	200 per hour

\* Based on the existing rate in Cox's Bazar

Source: DevCon analysis

### 9.9. Review of cable car option for Sonadia Island

The possibility of providing cable car connecting Cox's Bazar with Sonadia Island and for movement within Sonadia Island has been reviewed and following are the derived conclusion.

- **Connecting Cox's Bazar within Sonadia Island:** this will be about 8 km long need to cross a deep channel, will obstruct the fly path of airlines using the airport. Strong wind during adverse weather may cause instability in the system. Considering the above issues, it is found

that introducing a cable car link will be difficult.

- **Cable car system within Sonadia Island:** In recent times, the cable car has become a popular transport mode for tourists due to its comfort and time savings. A circular cable car link could have been a good transportation option but because of flat nature of the land about 40-60 towers would be required to be built (at a spacing of 250 m) which will require strong concrete foundation posing an environmental concern. Moreover, the cable car may also distract migratory birds' arrival on the Island. Considering the above issues, it is found that

introducing a cable car link will create major environmental and ecological risk.

## 9.10. Traffic management plan

### 9.10.1. Transport development approach

To provide efficient and comfortable transport service to the tourists, two important aspects need to be considered. First, aspect is the requirement of good quality infrastructure (with regular maintenance) and in addition, provision of good quality transport supported by efficient operation and management needs to be ensured.

The SE-TP:PIU, SE-TP:SPV or TKZC:SPV, as the case may be, will be vested with the development and subsequent maintenance of infrastructure. Apart, provision of transport (both battery-operated car and rented bicycle) can be outsourced to another company through TKZC:SPV model. The same company can be entrusted to procure, operate and maintain the water transport & jetties at Cox's Bazar and Sonadia Island. The roads drain and sidewalks in Cox's Bazar are not cleaned and poorly maintained due to lack of fund. A dedicated fund can be created for this purpose by imposing a levy on hotel rooms to generate funds. A similar approach can be adopted for Sonadia Island through imposing additional levy with the entry fee. These aspects of development approach are discussed in a separate chapter.

### 9.10.2. Parking facilities and management

There will be two transition parking area (one at Sonadia jetty point and the other at Maheshkhali) for tourists to switch over to internal eco-friendly transport. At these parking areas, docking stations will be provided for renting rented bicycles. Traffic wardens shall be provided at the parking area and at appropriate locations to manage traffic. Direction signs will be provided at appropriate locations to guide tourists.

### 9.10.3. Safety and security

Most of the highways in Bangladesh are accident-prone due to mix of slow- and fast-moving vehicles and the absence of strict enforcement of

rules. Only major accidents are reported, and most of the minor accidents are not reported or under-reported. The accident record from RHD shows that in 2014 only 7 accidents (fatality 9, injury 4) took place on Chittagong-Cox's Bazar stretch, and only 4 accidents took place (fatality 4 and injury 4) on Cox's Bazar-Teknaf stretch.

Adequate traffic signs and pavement markings should be provided on roads to be used by tourists in the Cox's Bazar-Teknaf tourist corridor. Within the Sonadia Island, necessary signs and markings should be provided. In order to ensure security, scanning machines and surveillance cameras shall be installed at jetty entry points for tourists entering Sonadia Island at Cox's Bazar, Sonadia and Maheshkhali. The smart applications using ICT tools should be deployed to enhance safety and security features.

### 9.10.4. Transport related information for tourists

Tourist guide map is an important component which needs to be provided by the tour operator to ensure, safe, comfortable and seamless transport for the tourists. The guide map should include the following information related to transport:

- Tourist spot locations with a distance;
- Transport mode, travel time and transport cost;
- Safety and security; and
- Weather and seasonal constraints.

The aspects which need to be considered during the preparation of a detailed MP&DP are as follows:

- Height of the road embankment;
- Estimated number of tourists visiting Maheshkhali Island and Sonadia Island;
- Limiting the number of tourists to Sonadia Island to save ecology;
- Type of road construction;
- Topographical survey of the road; and
- Possible diversion of tourists from Cox's Bazar to Naf and Sabrang tourism park when developed.

## Chapter - 10

# Master plan of SE-TP

### 10.1. Objectives of the master plan and planning framework

Sustainable eco-tourism, through SE-TP initiative, is a vehicle to foster economic and social growth of Bangladesh, through the achievement of the development imperatives, while minimizing negative social, cultural and environmental impacts. The master plan is a broad-brush plan providing a broad policy framework for an action plan and development plan. It also concerned with the development of broad strategies for managing and promoting organised and guided development over the medium and long-term attempts to integrate economic, physical and environmental objectives. In the master plan, many characteristics are incorporated to make SE-TP especially valuable as an agent for

development. As a cross-cutting initiative, SE-TP stimulates productive capacities from trade and the provision of jobs linked to the tourism value chain and the master plan, including the components planning, facilitate this phenomenon.

The principles of sustainable eco-tourism are adopted while developing the master plan, as depicted in **Exhibit No. 10.1**. The planning principles envisioned to be implemented in this uniquely conceived SE-TP, turn it into a fully integrated functionally best facility and to promote a new tourism image in Cox's Bazar, as well as to develop confidence for investors to undertake the development of the tourism project components and subsequent operation of their businesses. The master planning of IRC-CoE&IDC is discussed in a separate chapter.

#### Exhibit No. 10.1: SE-TP master planning principles

- 1 • SE-TP planning shall make optimal use of environmental resources that constitute a key element in Sonadia Island tourism development. The planning shall minimize the use of scarce and non-renewable resources in the development and operation of tourism facilities and services and ensure resource efficiency;
- 2 • SE-TP planning shall maintain essential ecological processes and help to conserve natural heritage and biodiversity of Sonadia Island. Meticulous efforts are taken in the planning to support the conservation of natural areas, habitats, endangered species and wildlife, and minimize damage to them and ensure to conserve biological diversity;
- 3 • Respecting the socio-cultural authenticity of host communities;
- 4 • SE-TP planning conserves built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance;
- 5 • Planning ensures viable, long-term economic operations. SE-TP planning ensures the economic viability and competitiveness of SE-TP destinations and enterprises including development companies, so that they are able to continue to prosper and deliver benefits in the long term including the proportion of visitor spending that is retained locally;
- 6 • Planning elements and components provides socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation. The aim is to maximize the contribution of tourism to the prosperity of the host destination thus enhancing local prosperity;

- 7 • The components have been planned to enhance employment quality and strengthen the number and quality of local jobs created and supported by tourism, including the level of pay, conditions of service and availability to all;
- 8 • The components have been meticulously planned to seek a widespread distribution of economic and social benefits from SE-TP throughout the recipient community, including improving opportunities, income and services available to the poor and ensure social equity;
- 9 • SE-TP is planned as a perfect blend of entertainment, education, information and learning meeting the diverse nature of tourist visitors across age groups, culture with vast and varied expectations. The planning provides a safe, satisfying and fulfilling experience for visitors, available to all without discrimination by gender, race, disability or in other ways and ensure visitor fulfillment;
- 10 • The planning process to engage and empower local communities in planning and decision making about the management and future development of tourism in their area, in consultation with other stakeholders and enhance local control;
- 11 • Maintaining and strengthening the quality of life in local communities, including social structures and access to resources, amenities and life support systems, avoiding any form of social degradation or exploitation is a key element in the planning so as to ensure community wellbeing;
- 12 • The planning process shall respect and enhance the historic heritage, authentic culture, traditions and distinctiveness and depict the cultural richness;
- 13 • Maintaining and enhancing the quality of landscapes of Sonadia Island and avoiding the physical and visual degradation of the environment and ensuring the physical integrity;
- 14 • Meticulous efforts are taken to minimize the pollution of air, water and land and the generation of waste by tourism enterprises and visitors and ensure environmental purity; and
- 15 • Provide an integrated tourism infrastructure system network to support the development comply with various norms and standards.

**Source:** UNWTO and United Nations Environment Programme (UNEP), MACE analysis

The master plan of SE-TP is to guide long-term growth within the planning areas by means of:

- Indication of potential locations of major development areas;
- Indication of important physical infrastructure; and
- Setting out policy recommendations for future development.

The objectives of the master plan are as follows:

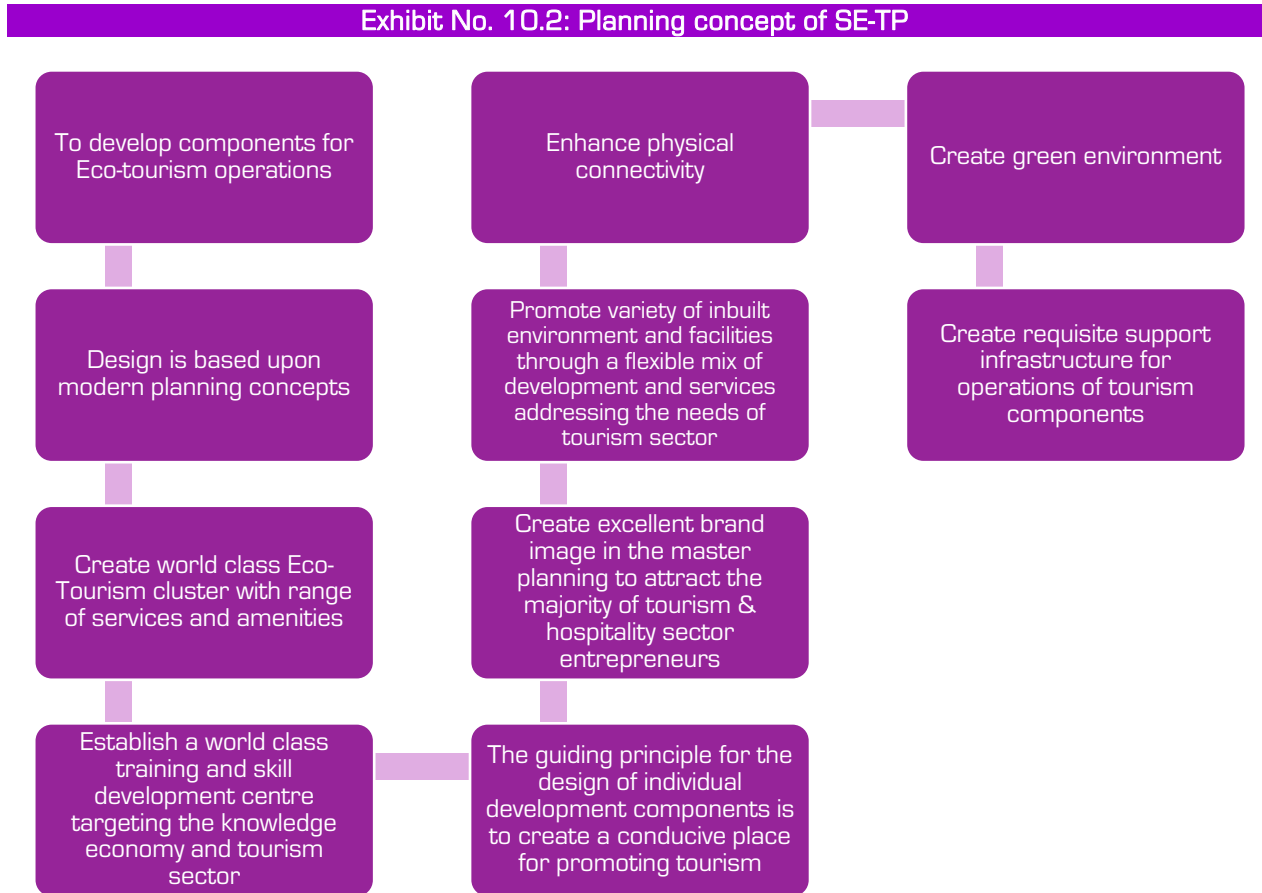
- To identify the main development issues, major opportunities and constraints;

- To identify the possible growth and physical expansion of the areas as foreseen considering economic base and growth trend;
- To identify the required and suitable land for future physical expansion and development;
- To identify the strategies for pursuing future development control in a desirable direction;
- To establish goals, policies and general proposals for urban spatial development; and
- To identify the development options to offer maximum benefit for the tourist.

## 10.2. Planning concept

The SE-TP is a self-contained region with a salubrious surrounding and will eventually emerge as a “Sustainable-holistic-smart-intelligent-Eco-Tourism zone”.

The components within the SE-TP follow an integrated planning approach, as depicted in **Exhibit No. 10.2.**



*Source: MACE analysis*

## 10.3. Planning considerations

The planning for the proposed SE-TP is in line with the broad objective of establishing an excellent business environment targeted principally at the eco-tourism sector, including hospitality sectors.

Each zone within the SE-TP will be dedicated to a particular activity and would be a self-sufficient eco-hub on the aspects of facilities, the ability to attract tourists, investments and revenue generation.

From the planning perspective, the SE-TP is a package of multiple land uses. The

pleasure/recreational activities are prime activities, and several other activity zones enhance the efficiency of the core theme. These include linking infrastructures, social infrastructure, community facilities, green spaces and several other activities such as research & skill development services, basic infrastructures & amenities.

Recreational, social and commercial amenities planned in the SE-TP will provide convenience to visitors as well as to the working population within the SE-TP. Landscaping and greenery designed as part of SE-TP development will house the project in a lush green environment.

The zoning plan consists of a combination of various zones which are spatially distributed with trunk connectivity between the zones integrated with the external transportation connectivity. It deals with the main aspects of development over the next 30 years (2020-2050).

The vital issues and principal strategies considered while planning the SE-TP for successful implementation and sustained operation includes:

- **Bio-diversity conservation:** Adequate measures are taken to conserve and protect biodiversity and ensuring the sustainability of the natural and cultural assets of the site.
- **Land use and layout:** The exercise includes appropriate division of the whole area into several zones and planning of various theme-based components and facilities under each zone. Development of the layout with a complete understanding of the phasing programme is a significant event. Integration of the environmental and financial aspects with physical planning aspects are the most important factor for successful implementation.
- **Constraints and core offering of the site:** As enumerated earlier, the planning considers all the site-specific constraints and appropriate mitigation measures to overcome the limitations. Similarly, the planning fully leverages the core and supplementary offering of the site.
- **Services and amenities:** The master plan takes into account planning for services and facilities.
- **Addressing the stay requirement for the tourists/visitors:** Different hierarchy of stay facilities in terms of customer tastes, preferences and affordability, to be planned within SE-TP, to accommodate the needs of tourists from various segments.
- **Lack of enforcement/control on land use and growth of unauthorised activities:** The well-conceived SE-TP guidelines and implementation framework adequately address this issue.
- **Skilled/Trained workforce / research work:** The SE-TP shall house training /skill development, and IRC-CoE&IDC shall facilitate.
- **Non-uniform distribution / concentration of development nodes:** A structured zoning considers effective utilisation of space, customer preferences, zone-specific requirements, infrastructure requirements and pollution level category. Accordingly, these considerations govern the planning of zones/subzones in the SE-TP.
- **Conservation of groundwater and surface water resources:** The activities include sustainable infrastructure planning, incorporation of eco-friendly concepts and environmental sustainability, water conservation schemes, environmental infrastructure, recycling and reuse options in the SE-TP development program.
- **Transportation:** The master plan looks at the transport linkages. As the SE-TP will have regional, national, as well as international linkages for tourist's movement, it will generate multi-fold traffic. Hence, planning of a well-developed transport network is a significant intervention.
- **Environmental management:** Various aspects such as adherence to pollution control norms & standards, protection of sensitive areas & provision of a suitable buffer, eco-friendly transportation system for internal movement within the Island, collection and handling of solid waste, efficient wastewater treatment system without polluting the environment are considered.



- **Identification of the most suitable area for development:** The zones and components are spatially distributed in suitable locations based on its function and the impact on the environment. An overview or inventory of existing physical, economic and infrastructure facilities have been considered for effective integration.

SE-TP development has a unique reason to be concerned about the sustainability of the natural and cultural environment owing to its dependency on the appeal of unspoilt landscapes and accessible local heritage, including the importance of the sustainable consumption of natural resources such as water and energy, besides the project site is ecologically sensitive. An attempt is made to ensure minimum disturbance to existing features, as depicted in **Exhibit No. 10.3**.

**Exhibit No. 10.3: Zonal planning considerations**



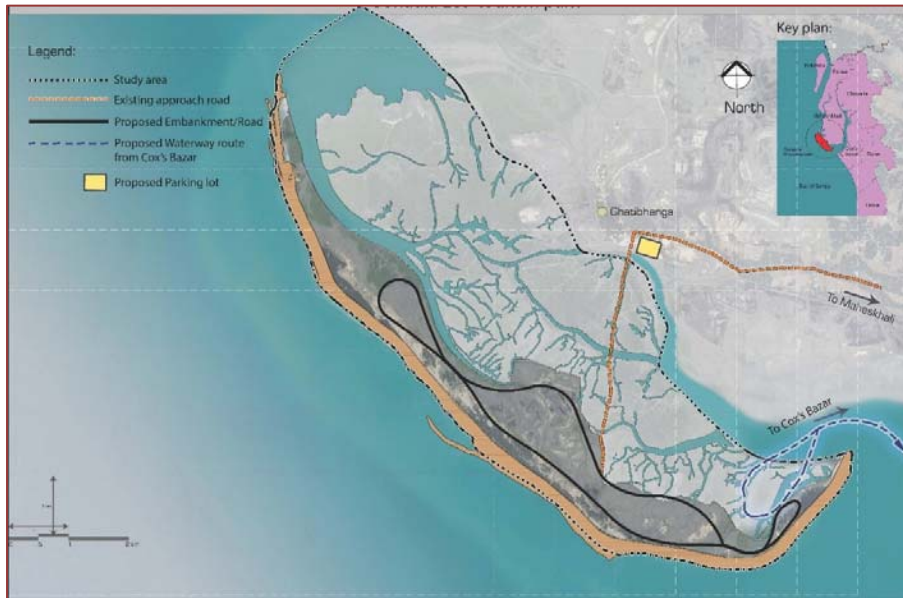
*Source: MACE analysis*

As a preliminary step of preparing the zoning plan, the internal trunk/spinal road alignment has been proposed. The total length of the proposed embankment is 17.9 km, and it acts as a spinal road for the proposed SE-TP. From this spinal road/embankment, internal driveways, pathways have been planned to connect the various development components within the SE-TP. This embankment serves as a protective structure from inundation due to water intrusion from an adjacent water channel.

Various site-specific features requiring considerations during the planning stage are addressed and presented below:

- 1) **Transportation connectivity and linkages** to the proposed site is depicted in **Exhibit No. 10.4**. Two alternate connectivity linkages are considered for SE-TP. SE-TP shall have the main connectivity by waterways from Cox's Bazar and Maheshkhali through jetty provided in entrance zone of SE-TP. For alternate road connectivity, the existing narrow access road will have to be upgraded for providing effective connectivity to the mainland.

Exhibit No. 10.4: Proposed transportation connectivity and linkages to SE-TP



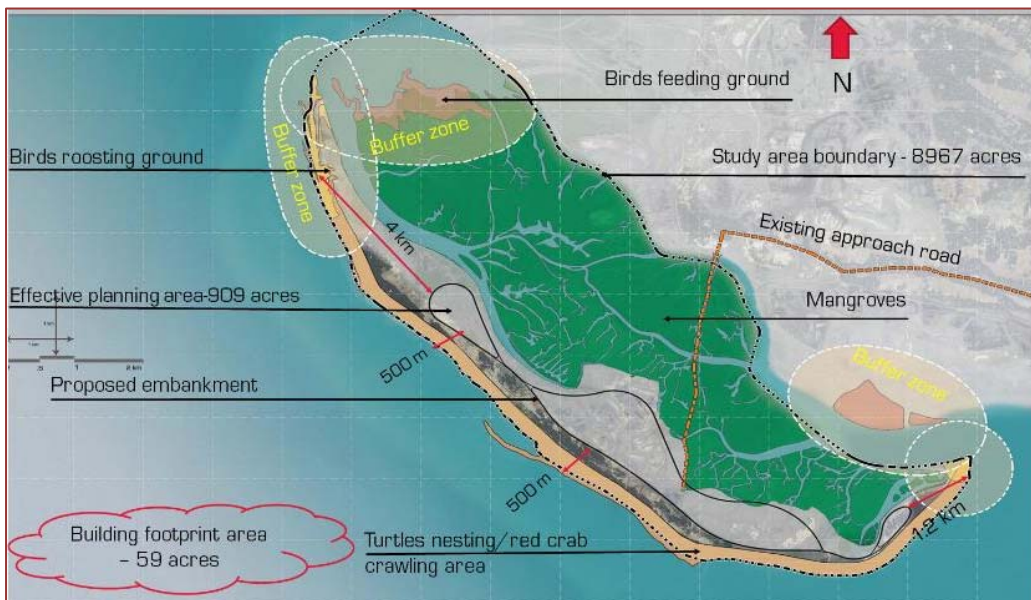
Source: MACE analysis

Detailed transportation plan and connectivity linkages are discussed in a separate chapter.

The **existing eco-sensitive areas** such as birds roosting and feeding ground, turtle's hatcheries & nesting area, red crabs crawling area along seashore, mangroves and water

channels have been retained, and these areas are excluded from the overall development plan. Adequate buffer is provided from the shoreline along the coast for protecting turtles & red crabs and also for birds roosting and feeding ground which is depicted in **Exhibit No. 10.5**. The enlarged version of the drawing is provided in **Appendix- Drawings**.

Exhibit No. 10.5: Natural features inventory of SE-TP



Source: MACE analysis

- **Birds roosting ground**

Birds roosting ground are found in the Northern and Southern side of the Island along the seashore as depicted in **Exhibit No. 10.5**. This ground acts as gathering spots for various local & migratory birds which is 1.2-4 km away from the proposed embankment. A minimum buffer of 500 m is reserved as “No development/ prohibited zone” surrounding this roosting ground area.

- **Birds feeding ground**

Birds feeding ground falls adjacent to roosting ground on Northern and Southern side of the Island as depicted in **Exhibit No. 10.5**. A buffer of 500 m has been reserved as “No development/ prohibited zone” surrounding this feeding ground area.

- **Mangroves**

Mangroves cover a considerable area of the Island and are a national asset which reflects

an ecologically critical area for environmental conservation. This area is kept aside and undisturbed while planning the developments of SE-TP and is reserved as “No development/prohibited zone”.

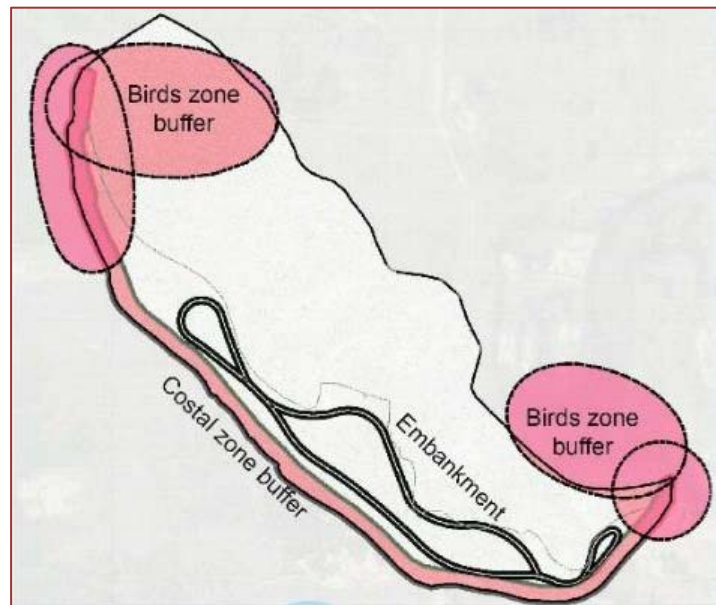
- **Red crab crawling area / turtle nesting area on seashore**

Geographically Sonadia Island looks like curve shape along the South-West direction. The sea beach of this Island acts as turtle’s nesting and red crab’s crawling area.

The turtle nesting spots are scattered on Sonadia Island. Buffer zones varying from 200-500 m from the shoreline has been reserved as “No development/prohibited zone”.

The proposed trunk road/embankment alignment considering the buffer zone is depicted in **Exhibit No. 10.6**.

**Exhibit No. 10.6: Proposed trunk road cum embankment based on the buffer zone**



*Source: MACE analysis*

- 2) The **predominant wind direction** is from South to North. The existing thick vegetation in the south acts as a natural wind barrier. It is proposed to retain this natural vegetation so as to

protect the proposed developments from natural hazards. Accordingly, the internal trunk road alignment has been proposed.

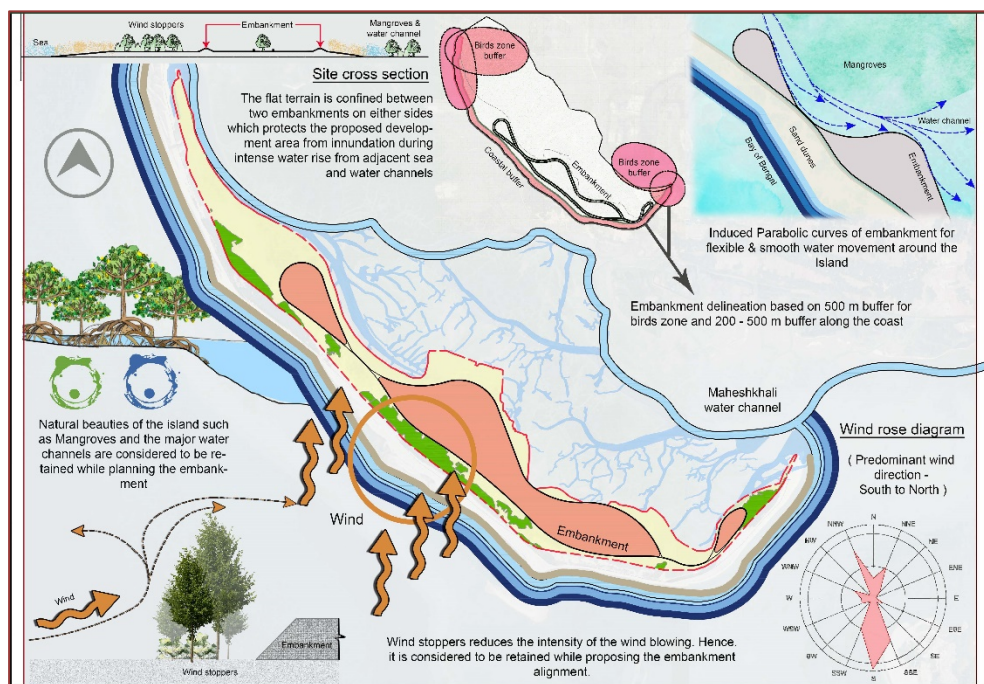


- 3) The top-level of proposed embankment including trunk road is planned above high flood level to protect the proposed developments from inundation due to water intrusion from adjoining water channels during high tide and heavy water flow.
- 4) The profile of parabolic curve has been adopted while planning the embankment/trunk road alignment. This geometrical profile offers better

dissipation of water currents and reduces the rupturing of the embankment.

The Exhibit No. 10.7 depicts the proposed internal trunk road alignment considering the above mentioned factors such as external transportation linkages, eco-sensitive area to be retained, buffer considerations, natural wind barriers and water level fluctuations of Maheshkhali water channel. The enlarged version of the drawing is provided in Appendix- Drawings.

**Exhibit No. 10.7: Conceptual planning of embankment/road**



Source: MACE analysis

The total area carved out for the development of SE-TP by providing embankment is 909.4 acres. Apart, an exclusive area for utility and public amenities is earmarked adjacent to the Northern entry point.

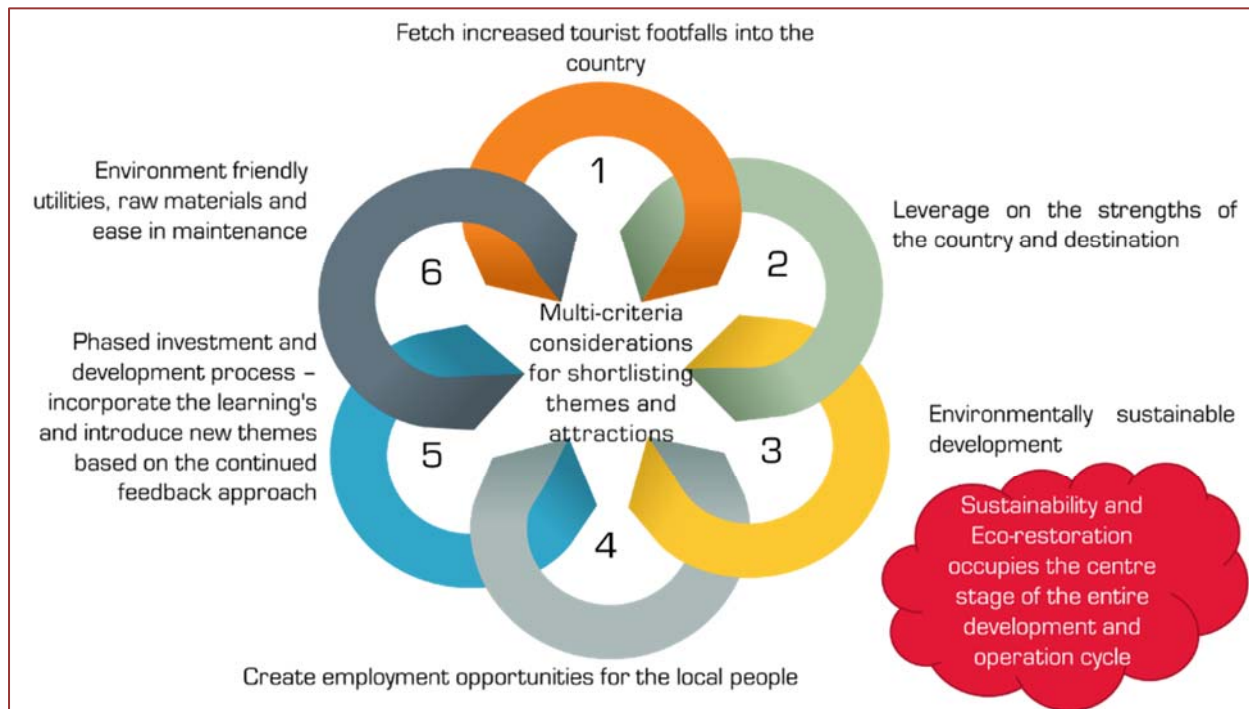
#### 10.4. Multi-criteria considerations for shortlisting themes and attractions and responsiveness check

The themes and attractions are decided based on benchmarking exercise and other considerations. Further, a structured process is

adopted for evaluating the themes and attractions based on adherence to a set of compliance criteria and its responsiveness, as it is pertinent that the themes and attractions fulfil the tenets of sustainable eco-tourism and promotion of knowledge-based green economy.

The key criteria are adopted in the responsiveness check of themes and attractions are depicted in **Exhibit No. 10.8**. Sustainability and eco-restoration occupy the centre stage of the entire development and operation cycle.

**Exhibit No. 10.8: Multi-criteria considerations for shortlisting themes and attractions**



*Source: MACE analysis*

To ensure fair representation across the criteria identified, compliance to 100% responsiveness test is done for the identified themes and attractions, as shown in **Table No. 10.1**. The threshold value for each criterion is

decided based on a number of possible occurrences with a reduction factor to reflect the skewed distribution. The responsiveness test is conducted to ensure 100% compliance.

Table No. 10.1: Multi-criteria considerations for shortlisting themes and attractions

S. No.	Themes and attractions	Fetch increased tourist footfalls into the country	Leverage on the strengths of the country and destination	Environmentally sustainable development	Create employment opportunities for the local people	Phased investment and development process – incorporate the learning's and introduce new themes based on the continued feedback approach	Environment-friendly utilities, raw materials and ease in maintenance
1	Entrance zone	Yes	Yes	Yes	Yes	No	Yes
2	Heritage and hospitality zone	Yes	Yes	Yes	Yes	Yes	Yes
3	Knowledge centre zone	Yes	Yes	Yes	Yes	Yes	Yes
4	Family entertainment zone	Yes	Yes	Yes	Yes	Yes	Yes
5	Adventure zone	Yes	Yes	Yes	Yes	Yes	Yes
6	Eco-science zone	Yes	Yes	Yes	Yes	Yes	Yes
	<b>Total count for the indicator</b>	<b>6</b> (All themes offer increased footfalls)	<b>6</b> (Representing the versatility, the destination and country)	<b>6</b> (All themes meeting the criteria as a part of eco-tourism development)	<b>6</b> (All themes meeting the overall SE-TP development objective)	<b>5</b> (5 themes meeting the criteria)	<b>6</b> (All themes meeting the criteria as a part of eco-tourism development)
	<b>The threshold level for the indicator</b>	<b>4</b> (At least 4 themes should enable enhanced footfalls)	<b>6</b> (All should ensure display of the versatility of the location and country)	<b>6</b> (All should ensure meeting the core objective)	<b>6</b> (All should ensure meeting the core objective)	<b>5</b> (At least 5 themes should facilitate phased development to recalibrate market needs and deferred investments)	<b>6</b> (All should ensure meeting the core objective)
	<b>Check for responsiveness</b>	<b>ÖK</b>	<b>ÖK</b>	<b>ÖK</b>	<b>ÖK</b>	<b>ÖK</b>	<b>ÖK</b>

Source: MACE analysis

## 10.5. Space allocation pattern

Table No. 10.2 elucidates the space allocation for the selection of the appropriate size of land for developing project components<sup>2</sup>.

Table No. 10.2: Space allocation for different components

Components	Consideration
Water-based amusement park	According to the comparison between similar parks, it was observed that the average acreage per million annual visitors for such parks is 15.8 acres/million. Accordingly, the area for the proposed water-based amusement park is ascertained to be 10 - 30 acres, where 20 acres can be considered for the base scenario.
Eco-science zone	As per the assumptions and according to the location of the birds feeding ground and turtles' nesting spots, it would be appropriate to demarcate the North-Eastern and North-Western extreme of the Island as eco-science zones.

<sup>2</sup> The space allocation pattern for shortlisted components from the product mix based on the draft interim report of "Feasibility study for the Economic Zone Site in Sonadia", BEZA

Components	Consideration
Premium resorts	Based on the examples considered of similar facilities in Southeast Asia, it is planned to spread over 45 – 50 acres for premium resorts including the spa & wellness centre and conference room facilities. Hence 47.5 acres can be considered for the base scenario. A single such facility is deemed sufficient as the destination is assumed as a day stay destination.
Budget hotels	Keeping the rationale, in order to cater to the non-premium tourists, budget hotels have been planned. A cumulative area of 0.5 - 1 acre can be allotted for such developments, and hence 0.75 acres can be considered for the base scenario.
Residential properties/ villas	As per the assumption, 50-100 luxury residential villas or bungalows (75 for the base scenario) are suggested to be built in the Island. A total of 5 - 10 acres spread across different locations (preferably along the beachfront) can be considered for such development, and hence 7.5 acres can be considered for the base scenario.
Convention centre	As per the benchmarking exercise and assumptions, the Island will comprise of a convention centre spread across 12 – 15 acres of land and hence 13.5 acres can be considered for the base scenario.
Heritage zone	According to the examples considered, the heritage zone with its various components will spread across an area of 45 – 50 acres and hence 47.5 acres can be considered for the base scenario.
Eco-cottages or tents	Eco-cottages or tents with a floor space of 70 sq. ft (4 person tents) are planned to be placed in strategic locations in the eco-science zone.
Water sports zone	The waterfront area (coast/beach area) of the Island will also cater to water sports lovers, and this area is planned to be home to a variety of water sports activities like jet ski, parasailing etc. It is expected to be one of the most visited areas on the Island.

**Source:** The space allocation pattern for shortlisted components from the product mix based on the draft interim report of "Feasibility study for the Economic Zone Site in Sonadia", BEZA

It is to be noted that the space allocation exercise and footfall estimation results are based on a mathematical model and benchmarking methods. These estimations are indicative in nature and might vary upon the actual implementation of the project, the construction period and the economic landscape of the region in the future.

### 10.6. Zones spotting

The activity includes division of the whole area into various zones considering the compatibility among the identified sectors of SE-TP and their ability to share the common infrastructure and facilities. The zoning design has smooth pedestrian circulation by simplifying the

movement patterns and allow inter-zone movement. Planning at strategic locations catering to the visitor's comfort and the surrounding feature is an essential element in the design.

It is prudent to consider the following parameters for effectively positioning the zones:

- Boundary shape;
- Physical site features;
- Area availability;
- Environmental considerations;
- Micro-climatic conditions;
- Compatibility issues;
- Surrounding areas;

- Accessibility;
- Transportation issues; and
- Visibility.

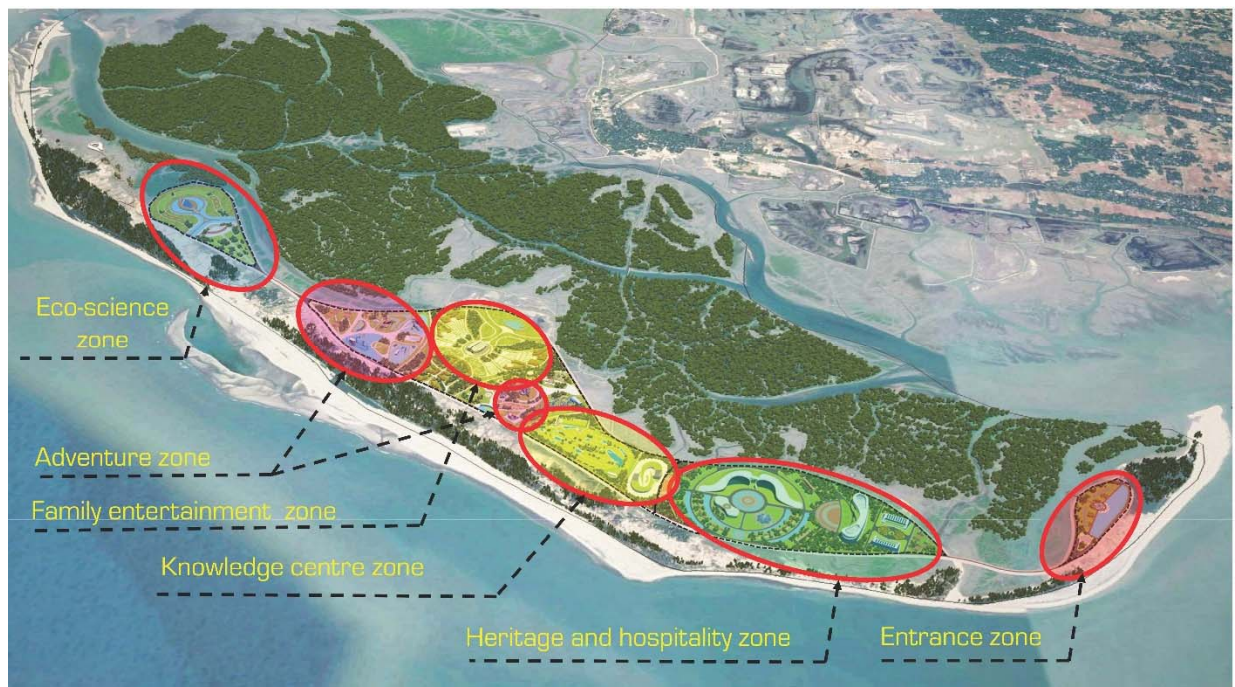
study of various case studies (both national and international) and in compliance with sustainable tourism destination and innovation and research hub development guidelines.

### 10.7. Zoning plan

The meticulous exercise was undertaken for zoning and components configuration considering the findings of tourist survey, the

The proposed zones have been spatially distributed within the proposed SE-TP based on various considerations, as depicted in **Exhibit No. 10.9**. The enlarged version of the drawing is provided in **Appendix- Drawings**.

**Exhibit No. 10.9: Zoning plan of SE-TP**



*Source: MACE analysis*

The area statement of zoning plan is provided in **Table No. 10.3**.

**Table No. 10.3: Statement of the zoning plan**

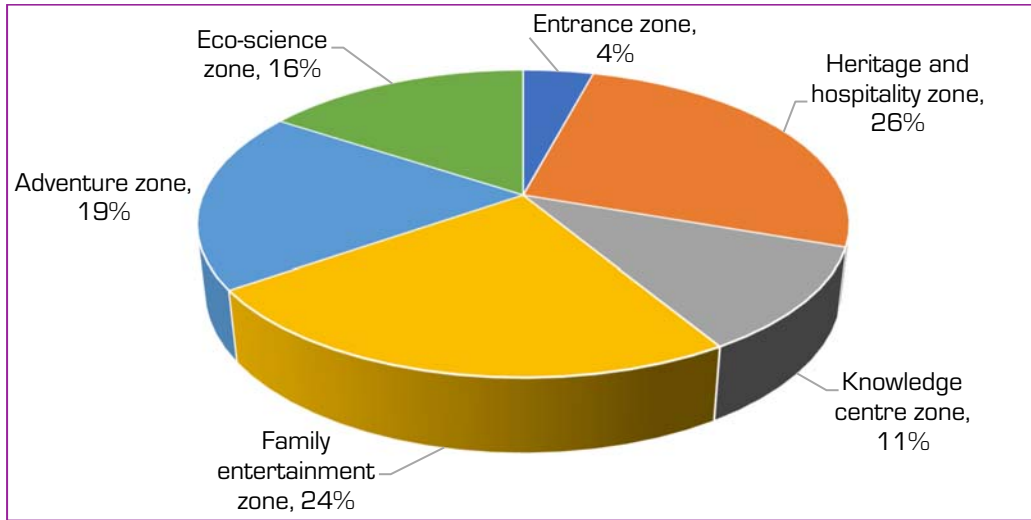
S. No	Proposed zone	Area in acres	Area distribution in %
1	Entrance zone	37.8	4%
2	Heritage and hospitality zone	238.3	26%
3	Knowledge centre zone	100.3	11%
4	Family entertainment zone	217.4	24%
5	Adventure zone	172.4	19%
6	Eco-science zone	143.3	16%
	<b>Total</b>	<b>909.4</b>	<b>100%</b>

*Source: MACE analysis*

**Exhibit No. 10.10** depicts the distribution of the land area of proposed zones within the SE-TP.



Exhibit No. 10.10: Land use pattern of proposed zones



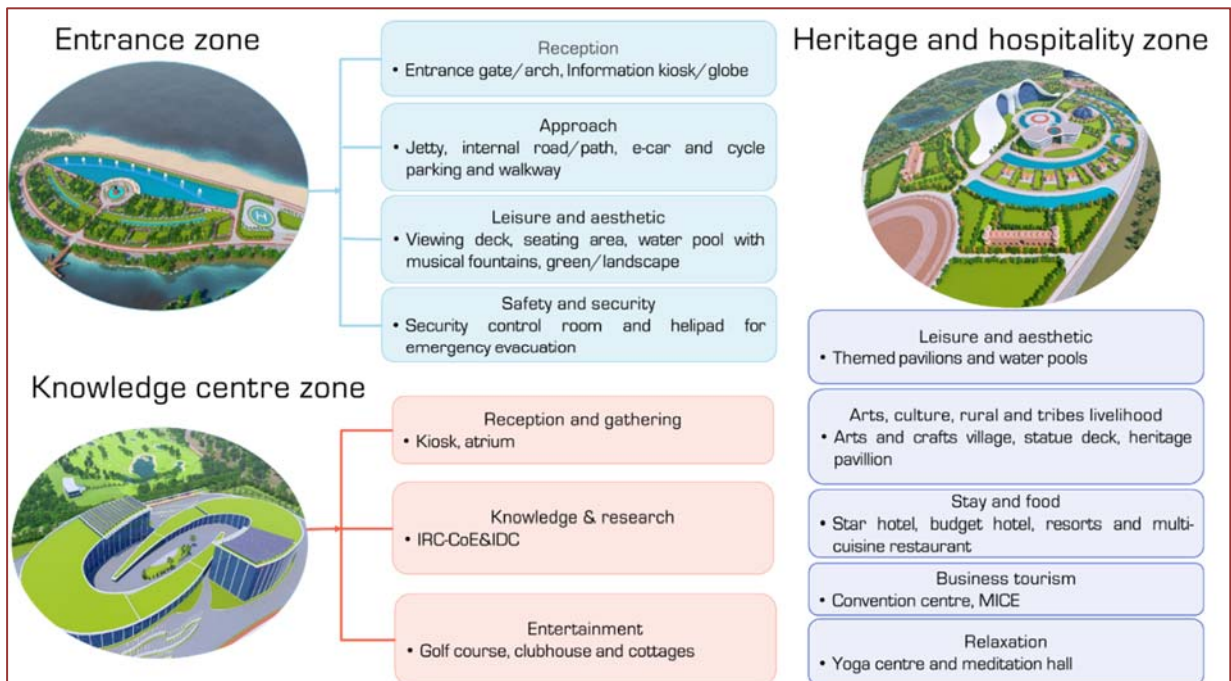
Source: MACE analysis

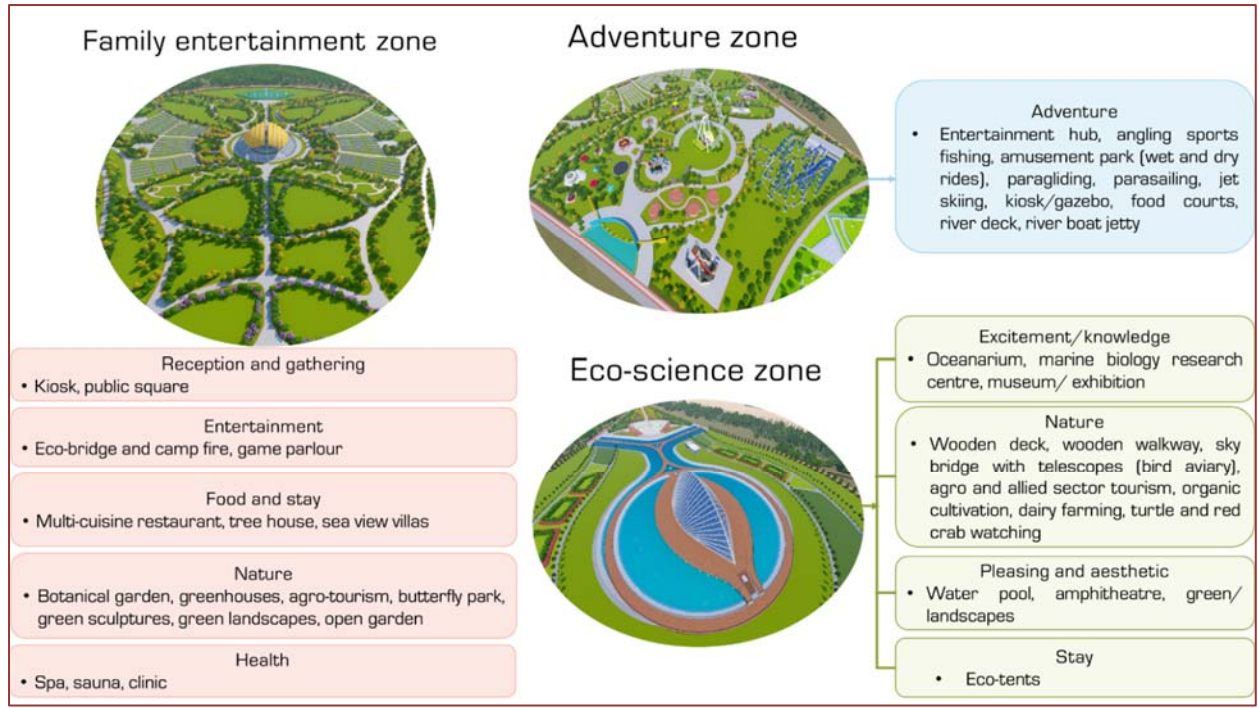
From Exhibit No. 10.10, it can be observed that the major land area of SE-TP is occupied by the heritage and hospitality zone followed by a family entertainment zone and adventure zone. This is in line with the derived expectation of the tourists as evident from tourist survey that the majority of the visitors are family members expecting a lot of pleasure/recreational activities and stay facilities.

### 10.8. Zones and components configuration

Multiple TAF and other facilities are proposed under each zone of SE-TP and are discussed in the following section. Exhibit No. 10.11 depicts the proposed infotainment zones, TAF and other facilities planned within SE-TP.

Exhibit No. 10.11: Summary of infotainment zones, TAF and other facilities





Source: MACE analysis

10.8.1. Entrance zone

The proposed area of entrance zone is 37.8 acres which act as an entryway for the tourists from Cox’s Bazar. This zone houses the TAF and other facilities which are essential for providing the tourist with all services including parking, information area, etc.

The waterway linkage from Cox’s Bazar shall connect the SE-TP through the proposed

jetty provided in the entrance zone on the Southern tip of the Sonadia Island. This facilitates all-weather embarking/disembarking of tourists and helipad is provided for emergency evacuation purpose. The internal access is provided through pedestrian walking, e-car & cycling, and all efforts have been taken to promote hassle-free pedestrian movements. The TAF and other facilities proposed within this entrance zone are presented in **Table No. 10.4**.

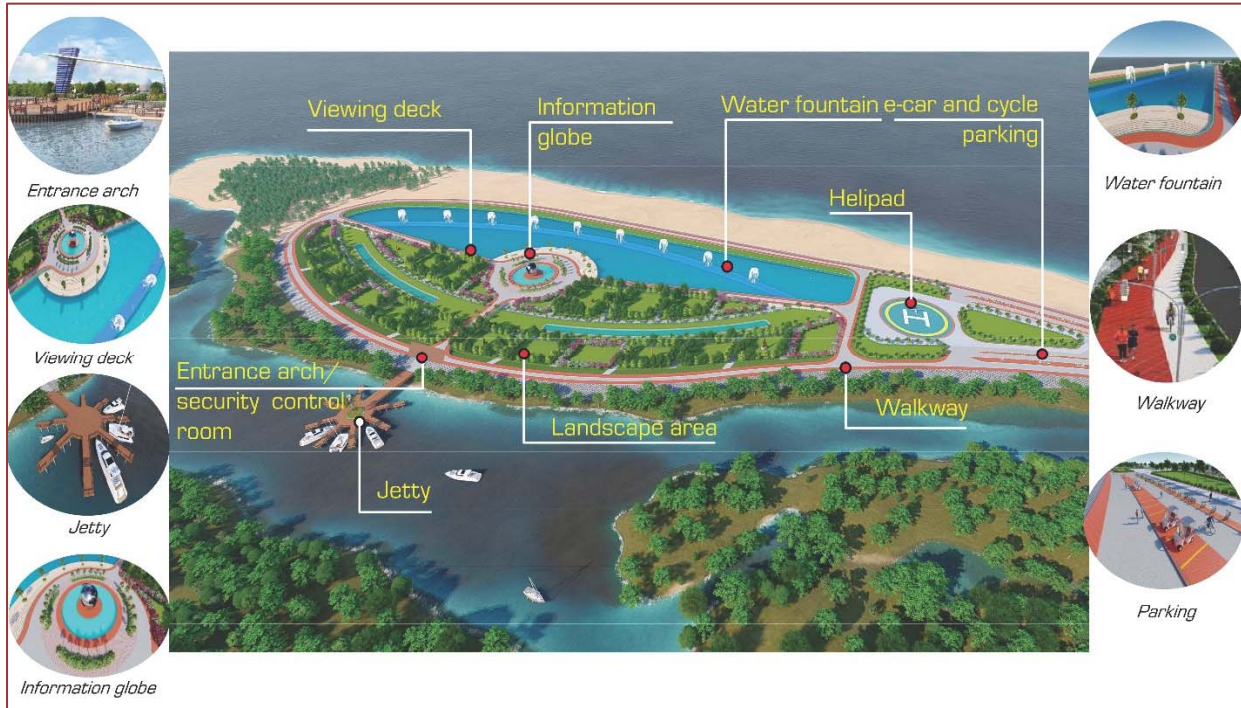
**Table No. 10.4: TAF and other facilities of the entrance zone**

Sl. No.	TAF and other facilities	Area in acres	In %
1	Internal road / path	9.7	26%
2	E-car and cycle parking	0.6	1%
3	Information kiosk/globe	0.4	1%
4	Helipad	0.7	2%
5	Viewing deck	0.6	1%
6	Water pool with musical fountains	11.5	30%
7	Green / landscape	14.1	37%
8	Jetty	0.3	1%
	<b>Total area</b>	<b>37.8</b>	<b>100%</b>

Source: MACE analysis

The aerial view of the entrance zone is provided in **Exhibit No. 10.12**. The enlarged version of the drawing is provided in **Appendix-Drawings**.

Exhibit No. 10.12: Aerial view of the entrance zone



Source: MACE analysis

10.8.2. Heritage and hospitality zone

Considering the taste and preference of the tourist (both domestic and foreign tourists), an exclusive zone in an area of about 238.3 acres has been proposed with various hospitality and heritage-based components.

Themed pavilions depict the local heritage with space for artists to exhibit their artistic capability. The staying facilities, MICE and

convention centre shall promote business tourism. A star hotel is also proposed considering the need. As part of inclusiveness, it is proposed to provide accommodation/stay facilities for all income category tourists, and accordingly, budget hotel and resorts are provided.

The TAF and other facilities planned within the heritage and hospitality zone, along with area details, are provided in **Table No. 10.5**.

Table No. 10.5: TAF and other facilities of heritage and hospitality zone

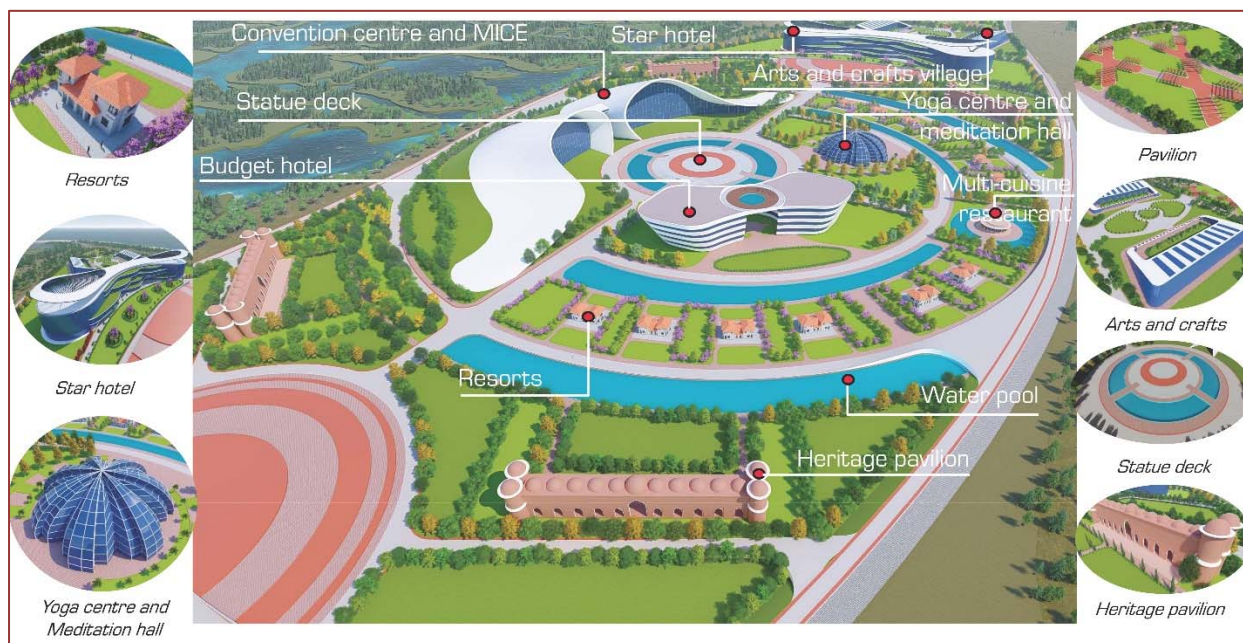
S. No	TAF and other facilities	Area in acres	Percentage
1	Pavilion	7.8	3%
2	Arts & crafts village	21.9	9%
a.	Themed pavilion	3.9	
b.	Internal road / path	3.4	
c.	Green / landscape	14.5	
3	Star hotel	31.5	13%
a.	Building	7.5	
b.	Internal road / path	4.1	
c.	Green / landscape	19.9	
4	Business and relaxation	177.0	74%
a.	Statue deck	17.0	

S. No	TAF and other facilities	Area in acres	Percentage
b.	Heritage pavilion	2.5	
c.	The convention centre and MICE	14.7	
d.	Budget hotel	1.2	
e.	Yoga centre and meditation hall	1.3	
f.	Resorts and multi-cuisine restaurant	1.2	
g.	Water pool	18.7	
h.	Green / landscape	85.9	
i.	Internal road / path	34.4	
<b>Total area</b>		<b>238.3</b>	<b>100%</b>

*Source: MACE analysis*

The aerial view of heritage and hospitality zone is provided in **Exhibit No. 10.13**. The enlarged version of the drawing is provided in **Appendix-Drawings**.

**Exhibit No. 10.13: Aerial view of heritage and hospitality zone**



*Source: MACE analysis*

### 10.8.3. Knowledge centre zone

This zone provides a blend of tourism, education and entertainment. IRC-CoE&IDC facility with green and energy-efficient buildings with a rooftop solar and rooftop garden provide a conducive business environment for knowledge workers. The objective is to perform innovation

and research activities to promote a green knowledge-based economy. The detailed considerations for the IRC-CoE&IDC are discussed in a separate chapter.

The components planned within the knowledge centre zone along with area details are provided in **Table No. 10.6**.

Table No. 10.6: Facilities of the knowledge centre zone

S. No	Facilities	Area in acres	Percentage
1	IRC-CoE&IDC	6.1	6%
2	Internal road/path	11.3	11%
3	Green/landscape	10.1	10%
4	Golf course	71.9	72%
5	Club house	0.4	0.4%
6	Kiosk	0.1	0.1%
7	Cottages	0.4	0.4%
<b>Total area</b>		<b>100.3</b>	<b>100%</b>

Source: MACE analysis

The aerial view of the knowledge centre zone is presented in Exhibit No. 10.14. The enlarged version of the drawing is provided in Appendix-Drawings.

Exhibit No. 10.14: Aerial view of the knowledge centre zone



Source: MACE analysis

#### 10.8.4. Family entertainment zone

From the tourist survey, it is inferred that the majority of the tourists visiting Cox's Bazar, constitutes families and hence it is imperative to provide a total family entertainment zone within the SE-TP. An area of 217.4 acres has been proposed for the family entertainment zone.

The family entertainment zone is meticulously configured as a confluence of natural living and getting back to nature while keeping the whole family engaged, thus making SE-TP as a memorable experience. The proposed TAF and other facilities with area details planned under this zone are provided in Table No. 10.7.

**Table No. 10.7: TAF and other facilities of family entertainment zone**

S. No.	Components	Area in acres	Percentage
1	Botanical garden	189.8	87%
	a. Greenhouses and agro-tourism	20.4	
	b. Butterfly park	15.8	
	c. Public square	5.3	
	d. Internal road / path	31.2	
	e. Green sculptures and eco-bridge	0.8	
	f. Green / landscape	115.5	
	g. Multi-cuisine restaurant	1.0	
2	Villas	0.4	0.2%
3	Open garden	27.2	13%
<b>Total area</b>		<b>217.4</b>	<b>100%</b>

Source: MACE analysis

The aerial view of family entertainment zone is provided in Exhibit No. 10.15. The enlarged version of the drawing is provided in Appendix-Drawings.

**Exhibit No. 10.15: Aerial view of family entertainment zone**



Source: MACE analysis

**10.8.5. Adventure zone**

An area of 172.4 acres of land has been proposed for adventure zone of SE-TP. As a part of offering infotainment, excitement, recreational

and adventurous trip for the domestic and foreign tourist, various adventurous TAF and other facilities are proposed in the adventure zone. Table No. 10.8 shows the proposals for an amusement park with area details.

Table No. 10.8: TAF and other facilities of the adventure zone

S. No	TAF and other facilities	Area in acre	Area in %
1	Dry rides and other adventure activity	90.2	52%
2	Wet rides and other adventure activity	82.2	48%
<b>Total</b>		<b>172.4</b>	<b>100%</b>

*Source: MACE analysis*

#### 10.8.6. Eco-science zone

To provide infotainment and knowledge about the bio-diversity of the Sonadia Island, an exclusive zone in the style of the eco-science zone has been proposed on 143.3 acres of land. 5<sup>th</sup> generation oceanarium with contemporary facilities, themes and state-of-art-infrastructure with the marine biology research centre to support R&D requirement of the oceanarium is interesting feature conceptualised. This TAF is dedicated to marine education and preservation of the marine environment.

The oceanarium facilities planned would broadly include main pavilion comprising of the deep-sea tunnel, shark tank, deep-sea forum, aquarium alley, lagoon etc. Secondary pavilion comprising of an artificial lake, educational pavilion, Marine heritage pavilion etc., sheltered walkway, polar pavilion and other themes & facilities. The layout takes into account the visitor influx and movement to different facilities in the complex. Accordingly, access to different zones

and the walkways have been planned to ensure proper circulation pattern to avoid congestion and facilitate free movement.

Marine biology research centre would have the minimum required facilities so as to render the required R&D support and technical support to the oceanarium in the area of marine biology. The facilities that would be planned as a part of the R&D centre would include laboratory for behavioural studies, marine ecosystem lab, Plankton facilities, marine museum, holding facilities' for sensitive marine organisms, lab for ecotoxicological studies, life-history traits, life cycle study lab, bioacoustics laboratory, breeding and rearing units, acclimatisation units, pathology & quarantine laboratory etc. Other TAF includes elevated sky bridge with telescopic provisions for bird watching, eco-tents and night camps. Turtle watching make SE-TP an attractive and unique destination for entertainment and learning.

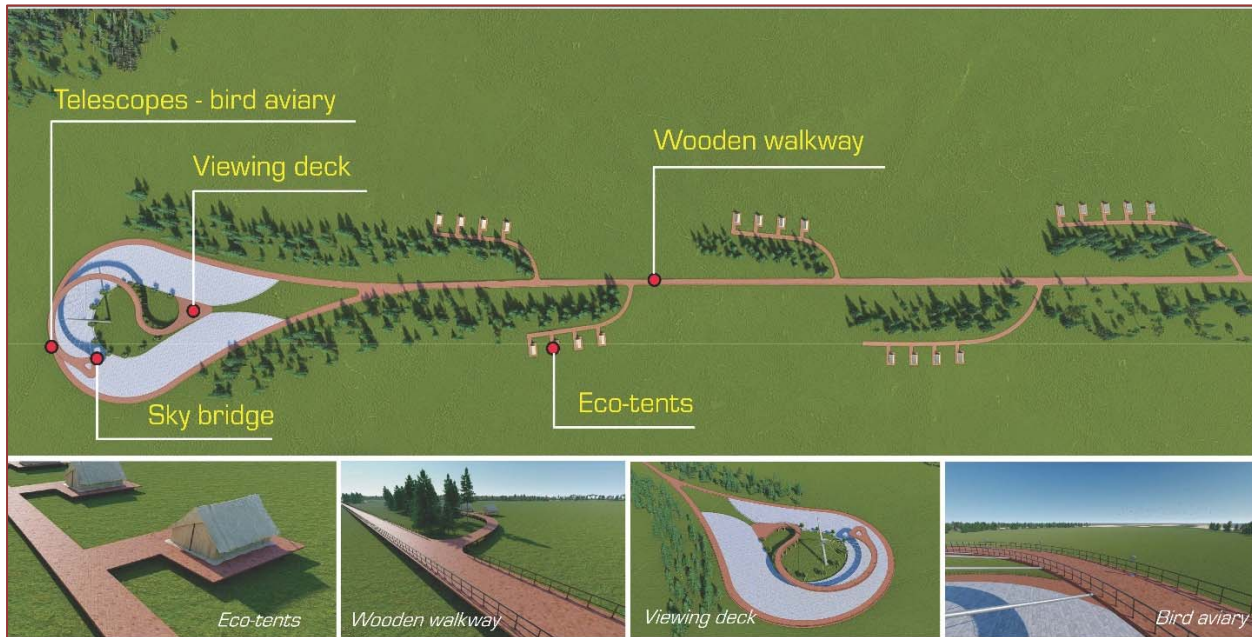
**Table No. 10.9** shows the TAF and other facilities planned in the eco-science zone.

Table No. 10.9: TAF and other facilities of eco-science zone

S. No.	TAF and other facilities	Area in acres	Percentage
1	Oceanarium	2.3	1.59%
2	Marine biology research centre	1.0	0.69%
3	Internal road / path	15.0	10.50%
4	Wooden deck	7.7	5.39%
5	Water pool	20.6	14.37%
6	Amphitheatre	5.0	3.50%
7	Green and organic cultivation	83.9	58.53%
8	Wooden walkway	4.5	3.13%
9	Eco-tents	0.3	0.20%
10	Sky bridge	0.8	0.53%
11	Green / landscape	2.2	1.57%
<b>Total area</b>		<b>143.3</b>	<b>100%</b>

*Source: MACE analysis*

The aerial view of the eco-science zone is provided in **Exhibit No. 10.16**. The enlarged version of the drawing is provided in **Appendix-Drawings**.



Source: MACE analysis

### 10.9. Zoning principles

The development bound to occur within the SE-TP premises shall comply with competent local byelaws. This shall ensure a uniform development of the structures and buildings

planned within the SE-TP. BEZA has prepared a stand-alone development control regulation guideline which derives its essence from the local planning guidelines (As per Bangladesh National Building Code). It shall be ensured that any



tenant/occupant unit in the SE-TP shall comply with the norms as stipulated below.

### Floor Area Ratio (FAR)

- Floor area ratio is defined as ratio between the total build-up area and total plot coverage; and
- In construction of building, FAR shall be 6, provided that internal roads, open to sky driveway and parking area, tanks, Sewage Treatment Plant (STP), Effluent Treatment Plant (ETP) shall be excluded from FAR calculation.

### Site coverage

In the construction site, the covered area shall be as follows:

- Maximum 50% of the total area shall be covered by tourism units;
- 30 % of the site shall be covered by the driveway, open parking, 50 sqm guard room, fire command centre, cycle stand, internal roads, underground water tank & septic tank; and
- 20% of the site shall be open to sky soak area, provided that soaking soft pave may be used instead of green grass or naked earth in the open space.

### Setback and height

- A minimum front setback of 12 m shall apply to the primary street and a minimum setback of 4.5 m shall apply to the secondary street or unless otherwise determined by the Authority;
- Side and rear setbacks shall be 3.5 m;
- Maximum permissible height shall be 15 m
- Notwithstanding anything contained in sub-rule (1) and (2), the Authority may, considering the following circumstances, make variation up to a reasonable limit in determining the setbacks, namely:
  - General streetscape;
  - Properties and buildings near and surrounding the site;
  - Fire separation distance;

- Solar aspect and prevailing breezes; and
- Bulk of the development.

### 10.10. Sustainability and smart initiatives

A strong foundation of sustainability concepts drives the development of SE-TP, and the planning exercise builds these principles in the conceptualisation stage itself.

**Annexure-10A** presents the sustainable elements conceived in MP&DP, including:

- Site planning and management;
- Sustainable transport;
- Water conservation;
- Energy efficiency;
- Material and resource management;
- Waste minimisation technologies;
- Scientific treatment of waste and energy recovery possibilities to reduce power consumption;
- Use of eco-friendly materials;
- Recyclable material;
- Avoidance of toxic chemicals;
- Usage of environmentally friendly products;
- Health and well-being; and
- Green education.

### 10.11. Amenity and utility area

Apart from the TAF and other tourism-related facilities, additional area to establish the basic utilities and public amenities is also planned within SE-TP. It is planned in a centralised location for easy access.

The total area for the proposed amenity is 4 acres. All essential supporting amenities are planned within the amenity zone of SE-TP as detailed below:

- 1) Administration building;
- 2) Training /skill development centre;
- 3) Primary health centre;
- 4) Disaster management centre;
- 5) Fire station; and
- 6) Police station.

The basic utilities planned within the earmarked utility area of SE-TP are water storage

structures such as underground sumps, overhead tank (OHT) and pumping system to meet the potable, non-potable and fire demand, electrical receiving sub-station and sewage

treatment plant (STP). The total area for the proposed amenity is 20 acres.

The location of public amenity and utility area is depicted in **Exhibit No. 10.17**.

**Exhibit No. 10.17: Location of public amenity and utility area**



*Source: MACE analysis*

# Master plan of IRC-CoE&IDC

### 11.1. Positioning of IRC-CoE&IDC

This chapter deals on the master planning of IRC-CoE&IDC so as to position it as a preferred investment destination for innovation and research activities in the emerging areas and international design services hub, where Bangladesh can have a competitive advantage.

IRC-CoE&IDC shall serve as a catalyst to foster innovation and to emerge as a regional centre of innovation and knowledge creation. Sustainable tourism takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities.

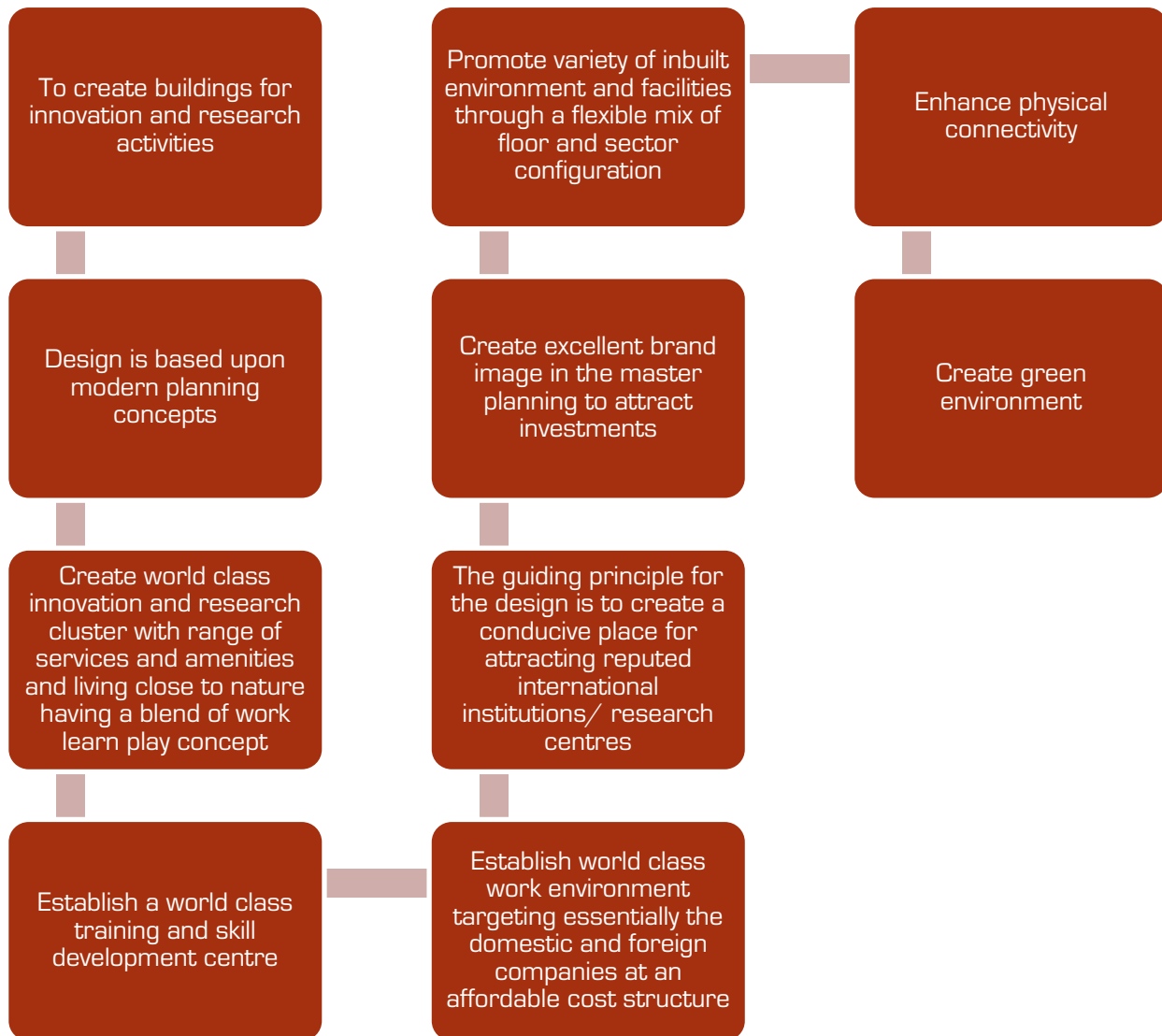
IRC-CoE&IDC is considered as a community of successful innovative companies, whose main aim is to increase the wealth of its community by promoting a culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.

The proposed IRC-CoE&IDC would become a major magnet for attracting domestic and international companies in the identified

segments for establishing their businesses, thereby creating employment opportunities and economic growth in Bangladesh. Furthermore, IRC-CoE&IDC is expected to provide a conducive environment for attracting international class educational universities and colleges, research & development institutions and knowledge workers industries with all supporting facilities as a feeder to the occupant units.

The campus planning concepts for the proposed IRC-CoE&IDC are depicted in **Exhibit No. 11.1**. The IRC-CoE&IDC shall be a self-contained campus with a salubrious surrounding and is envisaged to be developed as “Smart Intelligent-Eco-Campus”.

The IRC-CoE&IDC is envisioned to achieve the status of a world-class entity within the first decade of its existence. Commensurate with this, it shall have state-of-the-art construction and inbuilt facilities, global IT connectivity and support structure. The IRC-CoE&IDC shall be planned as an eco-friendly campus by using renewable energy and new technology in the development. The IRC-CoE&IDC shall evolve and constantly review its environmental strategy and shall create a benchmark for other institutes to follow.



*Source: MACE analysis*

Further, IRC-IDC can serve as project execution centre for global consulting, design, engineering business. High bandwidth, computing centres, high-quality documentation centre, world-class facilities shall be provided. The occupant units of this hub shall serve as global design, engineering, technical services group/business to domestic and international clients, both in product and project segments. In the arena of product design and engineering services, it can be the preferred home for a global engineering consultant and service provider to automotive, aerospace, renewable energy, defence & manufacturing industries etc. offering end-to-end

solutions with unmatched quality to help customers improve operational efficiency, shorten time-to-market and foster product innovation. The units can adopt cutting edge technologies and provide a focused solution to clients across the world. The occupant units shall leverage economies of scale and collaborative methodologies and also can leverage from the expertise of IRC-CoEs. The business units can have quicker documents production cycles, 24x7 project design activities and deliver high quality in close coordination with the parent group / clients offices worldwide. The facilities and work environment in the IRC-IDC shall lead to timely

completion of a highly time-bound complex project.

## 11.2. Broad design considerations

The broad design considerations of the proposed IRC-CoE&IDC are highlighted in **Table No. 11.1.**

**Table No. 11.1: Broad design considerations for IRC-CoE&IDC**

Functional requirements	User-friendly planning	Infrastructure, amenities and facilities	Green features
Fulfil the needs of each occupant unit/tenant within each subzone of IRC to have an identity, within the overall brand	Highly modular and compatible design in the concept stage	The excellent infrastructure required for the operation of innovation and research such as 24/7 water supply and power supply	The plan to comply with minimum green cover requirements
Safety norms for database and knowledge laboratories, etc	Biometric/swipe card security access system for buildings and offices wherever necessary	Specialised laboratory and infrastructure facilities for various type of targeted sectors	Should use materials appropriate to the local environment
Main administrative building and offices of management staff	To be in close proximity to administration services	Internal recreation rooms	Reduced energy consumption, response to climate etc.,
Main business centre	Fully equipped and furnished innovation and research spaces	Conference hall, meeting halls, lecture rooms, staff rooms, computer rooms and director room, office space, and start-up	Encourage the use of green technologies to minimise the carbon footprint, etc.,
Excellent infrastructure for business, innovation, research, training and commercialisation for effective consulting and consulting support services, methodologies, platforms and ecosystem	Support functions to be in close proximity – HR, finance, operations, IT	Facilities such as skill development centres, training centres, incubation units, QA & QC, display centres	Orientation, insulation, material properties, engineering practices, etc.
A stand-alone, self-contained executive education centre	To be in close physical proximity and provide easy access to core business zone	Excellent computational facilities, research, consulting and support services infrastructure	Low to zero-carbon demonstration community green campus: The plan to consider Leadership in Effective Energy Design (LEED)

Functional requirements	User-friendly planning	Infrastructure, amenities and facilities	Green features
			(platinum/gold/silver) certification
Activities, admissions, career services	Accessibility design (disabled friendly) in the concept stage	Latest Audio-Video (AV) technology to provide for seamless use of video conferencing facility between the foreign campuses and offices	Provide for rainwater harvesting and water treatment for recycling, sewage treatment, etc
Skill development centres	Synchronised, central time clock system for all lecture theatres, meeting rooms	Space for tea/coffee, and snack vending machines all over the campus	Heat recovery in HVAC systems
Storage space for a cluster of functions	Merchandise store should be close to the main entrance/lobby	Fully Wi-Fi campus	
Ample space for interaction among both IRC occupants and external agencies	Excellent usage of signage concept	Sports and recreation	
Minimise huge requirement of security guards through technological methods	Central reception and entry to be imposing	Wellness/primary care centre	
Aesthetically and functionally should respond to the local context	Business functions to be in close proximity	Convenience store	
Should be designed for extreme weather conditions	Glass doors in all offices for administrative staff	Book store	
Planning for support functions - administration section, finance and accounts section, an engineering unit, stores and purchase section	Faculty offices to be in close physical proximity and provide for frequent interaction	Bank branch/ATM	
Start-up offices and Incubation units	Sufficient parking for knowledge workers, staff and visitors	Café	

*Source: MACE analysis*

### 11.3. Thrust areas of IRC-CoEs

#### 11.3.1 Overview of GoB's life sciences sector

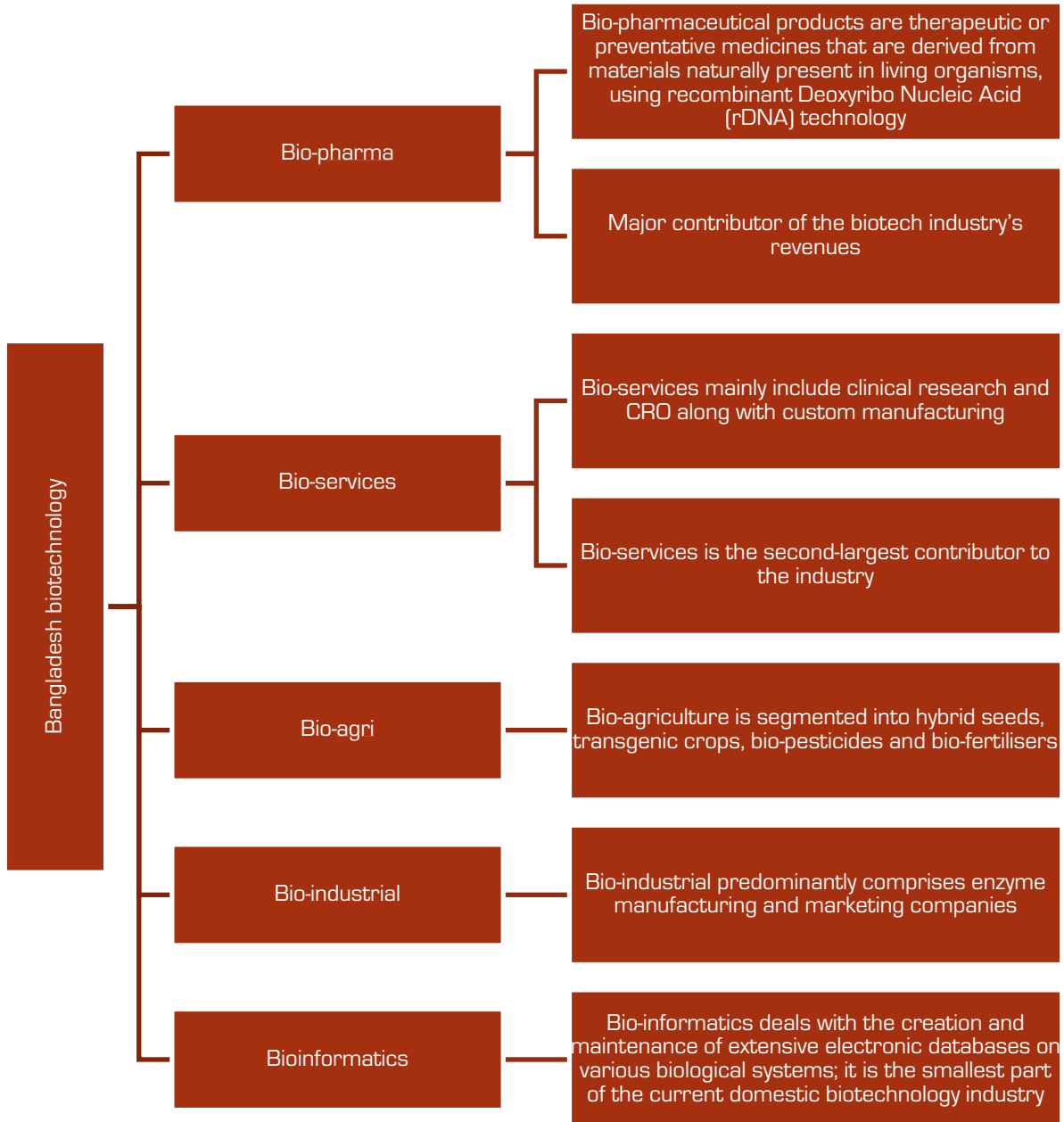
The modern biotech sector in Bangladesh is advancing moderately due to research on

several crops with support from policymakers, regulators, and development partners. The target is to ensure food security and safe food availability through the production of biotic and abiotic stress-tolerant crops with lower production costs. This target is encouraging scientists to research

new varieties through biotech methods. The regulatory system is making changes to keep pace with biotech research advancement and to accelerate the approval process.

The biotechnology industry can be divided into five distinct segments – biopharmaceuticals, bio-services, bio-agriculture, bio-industrial and bioinformatics and is shown in **Exhibit No. 11.2**.

**Exhibit No. 11.2: Biotechnology market segments**



*Source: MACE analysis*

The biotechnology sector in GoB holds good promises for improved agricultural productivity and products. It ensures better management of agricultural echo system

including water management, biofertilisers, biopesticides, bio-diversity and bioremediation. In short, it can play a vital role in the socio-economic development of a country. The spectacular

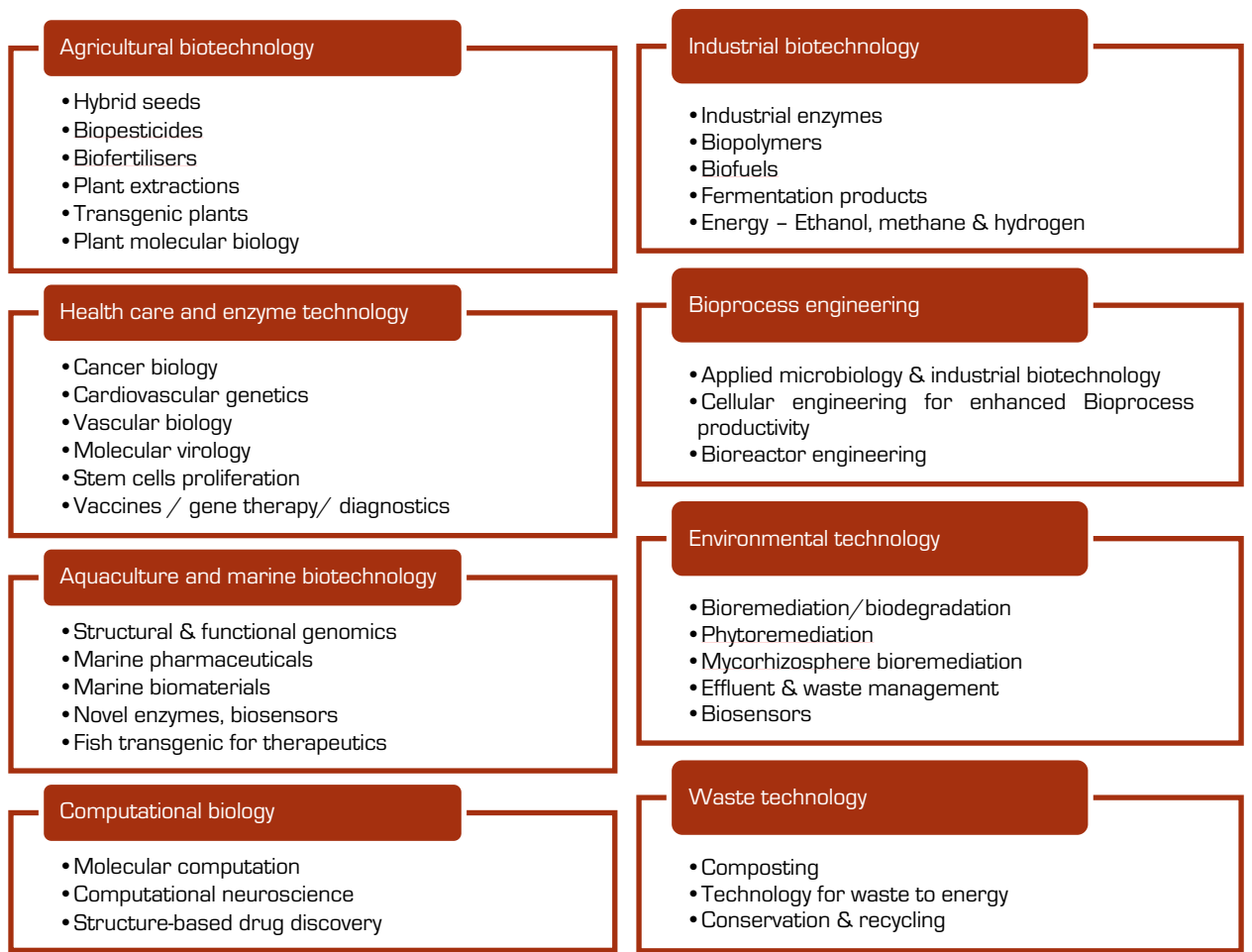
progress which has taken place in the last few decades indicate that we can no longer ignore the application of this technology for solving problems of agriculture, health, energy, industry and environment. However, a long-term plan, adequate financial support for R&D in different areas of biotechnology, setting up of demonstration plant, etc. are necessary prerequisites for application of this innovative technology for our national development. The IRC-CoE shall devise strategies and action plan for well-directed effort to harness the biotechnological tools for the generation of products, processes and technologies. This shall enhance the efficiency and productivity and cost-effectiveness of agriculture, nutritional security, molecular medicine, environmentally safe technologies for pollution abatement, bio-diversity conservation and bio-industrial development of

Bangladesh. Specific strategies shall be drawn to address sustainable development considering all the three dimensions of sustainability. Based on the sector analysis and growth segments, the IRC-CoE shall facilitate cutting edge research in the life sciences space.

*11.3.2 Thrust segments of life sciences from IRC-CoE perspective*

The thrust areas in the field of life science are identified to create a state-of-the-art facility for frontline studies and research and to generate technologies, products and processes based on such innovations in life sciences to contribute towards socio-economic development of Bangladesh. **Exhibit No. 11.3** shows the thrust segments of the life science sector for positioning IRC-CoE.

**Exhibit No. 11.3: Life science thrust segments in the context of IRC-CoE**



Source: MACE analysis



### 11.3.3 Overview of GoB's alternative and renewable energy sector

Bangladesh's substantial and sustained economic growth is placing enormous demand for its energy resources. The demand and supply imbalance in energy sources is pervasive requiring serious efforts by GoB to augment energy supplies. The electricity production in Bangladesh largely depends on naturals, and 80% of electricity generates from gas. Bangladesh has own proved reserved of the natural gas year until 201532.1 trillion cubic foot (TCF) and coal reserves 2797 million tonnes of coal which is equivalent to 37 TCF gas reserves. Bangladeshi gas field provided 2725 million cubic feet gas, 9263.7 million cubic feet condensate during the last operation on 21-22 September 2015 with a demand of 3800 in the fiscal year 2015-16. The power generation growth rate was 15% in the fiscal year 2015. BPDB expected that the gap of power generation 1000 MW recovers very soon within the fiscal year 2015. *[Source: Renewable energy in Bangladesh: status and prospects, Science Direct].*

Natural Gas, liquefied gas, coal, biomass & biofuel, hydro energy, wind energy, solar energy are the main available energy resources in Bangladesh. However natural gases are the energy sources in Bangladesh and 2725 million cubic feet gas, and 9263.7 million cubic feet condensate are provided in the fiscal year 2015-16 and the production of coal in the fiscal year 2015-16, 345751.44 metric tons. Energy consumption by fuel type natural gas 63 %, heavy fuel oil 18%, high-speed diesel 7%, power import 5%, coal 2%, and renewable energy 3% with 9200 km transmission lines, 332000 km distribution lines and 10% growth of electricity in the year of 2016. *[Source: Renewable energy in Bangladesh: status and prospects, Science Direct].*

Renewable energy can make a substantial contribution. It is in this context that the role of renewable energy needs to be seen. It is no longer "alternate energy" but will increasingly become a key part of the solution to the nation's energy needs.

The available renewable energy of Bangladesh is solar, biomass, wind, hydropower and geothermal energy and this are the potential renewable energy to eradicate energy problem in Bangladesh. In the total share of 3% to the national energy consumption, hydro, solar and wind energy share 60%, 39.5%, and 0.5% per cent respectively. Whereas in Bangladesh solar energy is the fastest growing renewable energy sector

Renewable energy has been an important component of Bangladesh's energy planning process since quite some time. According to the approved renewable energy policy, the GoB is devoted to facilitating investment in both public and private sectors in renewable energy projects to substitute contemporaneous non-renewable energy resources and to escalate the contributions of renewable energy-based electricity generation. A plan has been initiated by the GoB to generate 5% of the total energy from renewable energy resources within 2015 and 20% by the year 2020 [Source: Renewable energy in Bangladesh: status and prospects, Science Direct].

Bangladesh shares a percentage of renewable energy only 3% of total energy ratio, Bangladesh has already taken a master plan in the renewable energy sector. Whereas installed electricity generation installed capacity of Bangladesh rapidly increased to 13265 MW with captive generation capacity, which is insufficient for fulfilling the demand of electricity of the nations. One-third of the power production of Bangladesh depends on expensive imported fossil fuel energy resources, and 65% of power generation depends on a natural gas reserve of the country, though one day the reserve of current gas will be diminished. Moreover, inadequate electricity production leads the country in an un-industrialisation. The present and future crucial energy crisis situation adapted by installing renewable power into electricity production. The current renewable energy agenda of GoB force the specialisation of renewable energy. GoB has already announced a master plan for future electricity generation through the demand for power growing faster rate. Therefore, this strategy emphasises the countries natural resource exploration and

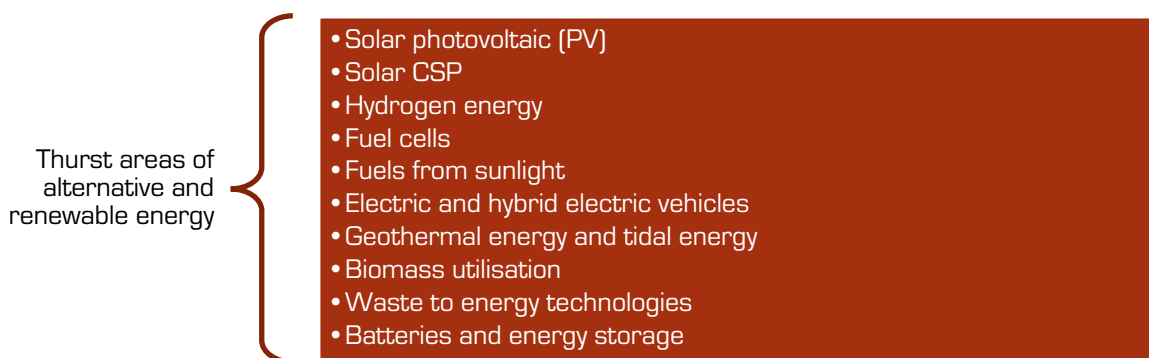
discoveries for further improvement of the power sector and reconstruct the renewables energy resource. However, to meet the near future demand, Bangladesh needs more sophisticated research facilities and skilled manpower for exploration activities both inland and offshore areas. The GoB intent to work with international advanced technology using human intellectuals of the country for energy sustainability. Renewable energy can be considered as a potential alternative to conventional energy that comes from fossil fuel. Currently, there is an immense interest in the use of renewable energy like solar, biofuel, geothermal, wind due to environmental

and economic concern. The GoB has put significant effort and target to establish different projects on renewable energy which also subsidised by the government *[Source: Renewable energy in Bangladesh: status and prospects, Science Direct].*

*11.3.4 Thrust segments of alternative and renewable energy from IRC-CoE perspective*

**Exhibit No. 11.4** shows the thrust segments of alternative and renewable energy for positioning IRC-CoE.

**Exhibit No. 11.4: Alternative and renewable energy thrust segments in the context of IRC-CoE**



*Source: MACE analysis*

*11.3.5 Overview of GoB's information technology sector*

The Information Technology – Information Technology enabled Services (IT-ITES) industry is another area where GoB may position this sector as a growth driver for the economy. Bangladesh has a huge educated, unemployed youth force with the ability to read and write English. The country can take advantage of its immense human resources to train and prepare programmers and IT professionals. GoB has already started a project to develop Computer Programmers in Bangladesh. All the universities are offering a one-year post-graduate Diploma course for the graduates. The young generation in Bangladesh is very enthusiastic and has correctly identified IT as the future of the country. There are numerous computer clubs, computer festivals, programming contests, web design contests, IT-related seminars and discussions in many cities of the country. Recently, there has

been a surge in E-commerce activities in Bangladesh.

Software and IT service industry in Bangladesh have crossed a long road over the last few decades. It has matured. Not only the industry is contributing significantly in the national income, but also it has been playing a very crucial role in creating high-quality employment for a sizable portion of young graduates of the country. The presence of a high number of young entrepreneurs is one of the distinctive features of this industry. In the last decade many tech-savvy young graduates, some of them returning from abroad after finishing education, have started their IT ventures. Despite various local and global challenges, these young spirited entrepreneurs have done remarkably well in building sustainable business organisations through their hard work and passion. Surely, the enthusiasm and resilience of the young entrepreneurs are the main driving force of Bangladesh IT industry.

GoB has declared IT as a thrust sector, and that computer training centre will be set up in each Divisional and District headquarters of Bangladesh. A tremendous activity is going on in every sector including e-commerce, e-governance, computer networking, Internet, web browsing, web applications, multimedia product development etc. GoB has taken some important initiatives to develop IT and ICT sector as highlighted below:

- IT has been declared as a thrust sector;
- Quick implementation of the recommendations of a high-powered committee for software export;
- Waiving all taxes and duties from import of computer hardware and software;
- Hundred per cent remittances of profit and capital gains for foreign investors without any approval;
- The decision to link Bangladesh to the global highway through submarine cable link by next two years;
- GoB formulated a roadmap for development in ICT in 2016;
- The activities are clustered in six categories: industry, infrastructure, e-governance, human resources development, laboratories and services.
- The roadmap for the industry has set targets to generate 1,000 innovations, raising software export earnings to USD 5 billion by 2021, developing an eco-system for the gaming industry etc. Moreover, innovation and entrepreneurship academies will be set up;
- The government has identified 100 aspects of the judiciary where ICT can be harnessed and assist in the resolution of 3 million cases currently in backlog;
- The construction of 554 Business Process Outsourcing centres underway and that 2,100 Digital Lab and Language centres out of 2,972 have already been built;

- 7-year tax holiday for registered IT companies;
- The BPO has set a goal to connect over 3 corers unbanked people with the banking system this year by the digitised 'Daak Taka' which only requires Tk 2 to open an account; and
- ICT exporter's get 10% cash incentive opportunities from July 2017.

Some private organisations have already started to work for setting up an IT park and IT villages in the country. Some investors are foreigners, and they are very much interested in building Bangladeshi students as IT professionals. To support the development of the ICT industry, Bangladesh Hi-Tech Park Act was passed in 2010. Subsequently, Bangladesh Hi-Tech Park Authority (BHTPA) was established in 2010 for creation, management, operation and development of hi-tech parks across the country. Most important and top priority projects are:

- Kaliakoir Hi-Tech Park;
- Jessore Software Technology (IT) Park;
- Sylhet Hi-Tech Park;
- Mohakhali IT Village;
- Janata Tower Software Technology Park; and
- Barendra Silicon Valley, Rajshahi.

As a part of digital security, GoB has taken measures like:

- World standard forensic lab;
- Constitution of a Cyber Security Agency;
- Establishment of cyber incidents responsive team;
- A high-level digital security council;
- The GoB, in collaboration with cybersecurity and technology giants, has successfully organised an international cybersecurity conference in the capital on 9th March 2017 aims at taking a coordinated initiative to prevent and check the alarming rise of cyber-attacks; and

- BGD e-GOV CIRT launched Mobile app for reporting cybersecurity incidents to GoB Computer Emergency Response Team. It is free, easy-to-use, and suitable for users of Android phones. The app will transmit the reports from users via a secure internet connection to the incident handling team who will then contact the users or complainants to assist in resolving the incidents.

According to the Bangladesh Association of Software and Information Services (BASIS) survey, there are over 800 registered software and ITES companies in Bangladesh. There are another few hundred of unregistered small and home-based software and IT ventures doing business for both local and international markets.

The total industry size is estimated to be around Tk. 1,800 crores (US\$ 250 million). Approximately 30,000 professionals, majority IT and other graduates, are employed in the industry. Though compared to other traditional mainstream industry, the contribution for overall employment creation is not significantly high, but if considered in terms of creating high-quality employment (average monthly compensation over Tk. 15,000 per month), software and IT service industry is surely one of the top graduate employment sectors in the country.

Digital Bangladesh” is an integral part of the GoB’s Vision 2021-which promises a prosperous and equitable middle-income Bangladesh by its golden jubilee of independence. GoB has outlined Digital Bangladesh having four key priorities:

- i) developing human resources ready for the digital age;
- ii) connecting citizens in the ways most meaningful to them;
- iii) taking services to citizens’ doorsteps; and
- iv) making the private sector and market more productive and competitive through the use of digital technology.

ICT is the backbone of any digital initiative, and it covers the vast area of information technology, communication technology and the telecommunication technology. The country is successfully leveraging this rising penetration and has earned \$800 million in 2017 by exporting ICT products and services.

On top of these, the total number of Internet Subscribers has reached 80.483 million at the end of December 2017, can be seen as a consequential blessing of the recent progressive steps taken by the present government and the growing ICT sector.

The data provided by BASIS publication indicate that IT-ITES and ICT industry plays an important role in promoting economic growth, e-governance and skill development as seen below:

- Number of registered ICT companies: 4,500+;
- Number of BASIS member companies: 1,031;
- Demand for software in the local market: US\$ 1.18 billion;
- The number of IT/ITES professionals: 3,00,000 (appr.)
- The market value of IT/ITES: the US \$400+ (Ministry of Finance, GoB);
- Total earnings of the industry in FY 2015-16 were USD 650 million, out of which exports amounted to USD 151.83 million (source: EPB);
- Export earnings from the ICT sector stood at about \$190.94 million in Fy 2016-17 (source: EPB);
- Over 400 IT companies currently export to over 60 countries, with North America being the main destination;
- The size of Bangladesh’s e-commerce market is estimated to be \$110-115 million (around Tk 900 crore) in 2017, growing from \$65-70 million in 2016;
- The potential market for online shopping is about Taka 2,000 corers;
- The prospects of the sector have compelled the GoB to set a target of

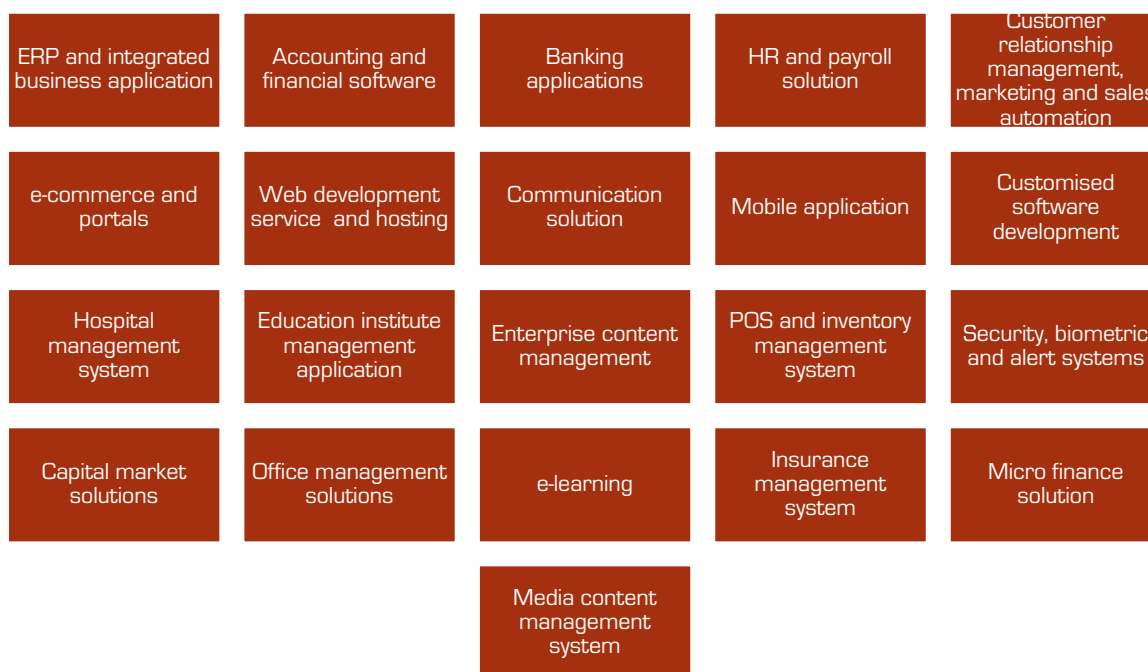
- USD 1 billion export earnings by 2018;
- With the current trend of export, capacities and available resources, the target notches up USD \$5 billion by 2021;
- The bandwidth capacity of the submarine cable has been already raised to 200 GBPS from 44.6. Another 1600 GBPS is contemplated to be added by February 2017;
- Approximately 3, 00,000 IT and ITES professionals with majority IT and other graduates are currently employed in the industry.
- Local industry's revenue generation of US\$ 0.9-1.1 billion in 2017 (Source: Everest Group, December 04, 2017);
- However, BASIS Research (Latifee & Hira, May 2017) shows that the local market size for the ICT sector in 2017 was US\$ 1.18 billion.
- Bangladesh has climbed up 24 places in the United Nations E-Government Development Index. The country has secured an impression leap upward to the 124th position in 2016 from 148th in 2014;
- More than 200 services have been provided to the people through 5, 275 digital centres established all over the country;
- Over 25,000 web sites including those of Upazilas, Districts, Divisions, departments and directorates have been added to national web portal;
- National Enterprise Architecture (NEA) is being built by the GoB to facilitate interoperability and operation of e-governance activities;
- Leveraging ICT for Growth, Employment & Governance (LICT) project;
  - Total 75,000+ youth to be trained over the next three years
  - 10,000 top-up training
  - 20,000 foundation skills training program
  - 20,000 online outsourcing training
- Under the Skills for Employment Investment Program (SEIP), a total of 1.25 million youth to be trained by 2021;
- Under the Support to Development of Kaliakoir Hitech Park project, 4,981 youths have received ICT training;
- To increase self-dependency, Learning and Earning project is working on creating 55,000 freelancers;
- Under the Bari Boshe Borolok (Getting Rich at Home) project, 14,750 youths have been trained as freelancers of whom 70 per cent are women;
- BHTPA has imparted training to around 6,500 youths in different areas of ICT. Around 6,500 youths so far to enable them to get employment capitalizing on their skills in the field of ICT. Of them, around 4,700 trainees have already got jobs under Employment Incentive Program.

*Source: BASIS report*

### *11.3.6 Thrust segments of IR-ITES and ICT from IRC-CoE perspective*

**Exhibit No. 11.5** shows the thrust segments of IT-ITES and ICT for positioning IRC-CoE.

Exhibit No. 11.5: IT-ITES and ICT thrust segments in the context of IRC-CoE



Source: BASIS survey

11.3.7 Overview of GoB's environment sector

➔ Drivers and issues from the environmental perspective

A selective list of drivers and issues in the changing institutional framework from the environmental perspective are shown in Exhibit No. 11.6. The multifaceted growth of environmental governance throws a substantial challenge in developing sustainable infrastructure.

Exhibit No. 11.6: A selective list of drivers and issues in the changing institutional framework from the environmental perspective

<ul style="list-style-type: none"> <li>• Voluntary agreements on CFCs</li> <li>• Voluntary agreements on CO<sub>2</sub></li> <li>• Concept of people, planet and profit</li> <li>• Eco-labelling/eco-logo</li> <li>• Zero waste concepts</li> <li>• 7R concepts</li> <li>• Waste disposal</li> <li>• Contaminated land</li> <li>• Packaging</li> <li>• Returnable containers</li> <li>• Recycling</li> <li>• Environmental disclosures</li> <li>• Environmental audit</li> <li>• Green audit</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable development</li> <li>• Sustainability reporting</li> <li>• Ethical investment</li> <li>• Green consumerism</li> <li>• Control of road transport</li> <li>• Alternative fuel</li> <li>• Green power</li> <li>• Energy taxes</li> <li>• Tradable pollution permits</li> <li>• Greener employees</li> <li>• Public pressure</li> <li>• Organisational environmental policy</li> <li>• Supplier audits</li> <li>• Rural engagements</li> </ul>
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GoB has been actively pursuing a range of initiatives to support its policy objective of promoting environmentally sustainable growth.

Clean technologies, as distinct from “end-of-pipe” abatement technologies minimise the generation of waste streams in the production processes and utilise waste from other consumer goods and production processes, rather than treating the waste after generation. In general, clean technologies are less intensive in the use of raw materials and energy, than conventional technologies, which rely on pollution abatement after generation. For this reason, they may also offer significant cost advantages to the producer.

#### ➤ Water pollution control equipment

Due to the growing awareness of preventing water pollution and stringent environmental control standards being enforced for various uses, including process industries, the water/wastewater treatment industry is poised for huge growth. The various categories of water pollution control equipment broadly include wastewater treatment plants, drinking water treatment plants and effluent treatment plants. Water/wastewater treatment is the process of removing contaminants, and it includes physical, chemical and biological processes to remove physical, chemical and biological contaminants. The primary treatment is the first step in the treatment process and involves the removal of pollutants that settles or floats. The common industrial equipment is clarifiers, and oil-water separator devices. The secondary treatment is designed to substantially degrade the biological content of the sewage. The common equipment is activated sludge, filters, biological reactors etc. The tertiary treatment is a polishing step to remove contaminants that missed in the primary and secondary treatment and removal of suspended solids, refractory organics and toxic components. Tertiary physical processes are filtration and carbon adsorption. Chemical processes are used to remove inorganic and organic, resistant to biodegradation. The chemical process includes precipitation, oxidation and neutralisation.

The biological processes involve biodegrading. Organisms such as bacteria, fungi, yeasts and algae are commonly used to break down the organic matters. The cell tissues are then removed from the treated water by a physical method like clarification.

The complete plants are manufactured mostly in the organised sector, and many of the equipment is manufactured in the small-scale sector as well. There is need for continuous up-gradation in technology, especially with regard.

#### ➤ Air pollution control equipment

Like water pollution control, air pollution control is also in the public eye. Citizens expect clean air and clean water will be available to them as these are basic necessities. Industrialisation and urbanisation have resulted in a profound deterioration of air quality. The most severe environmental problem, come in several forms, including vehicular emissions and untreated industrial smoke. Air pollution in the country, especially in metropolitan cities and large towns, has assumed great significance with the adoption of stringent environmental control standards for various industries. Hence the pollution control equipment industry has acquired importance.

The choice of control method depends on factors such as the nature of pollutant, flow-rate (amount of pollutant emitted), particle size and desired collection efficiency. The air pollution control equipment is broadly classified under the categories such as settling chambers, cyclone and multi-cyclones, bag filters, wet scrubbers, spray tower, venturi scrubber, ionizing scrubber and electrostatic precipitator.

The industry is in a position to do basic and detailed engineering and supply of plants on turnkey basis.

#### *11.3.8 Thrust segments of the environment sector from IRC-CoE perspective*

**Exhibit No. 11.7** shows the thrust segments of the environment sector for positioning IRC-CoE.



*11.3.9 Overview of GoB's design, engineering and consulting services*

An overview of Bangladesh consulting sector is given below:

- Consulting and consulting support services spread across a range of segments – research and analytics, business intelligence, technical analysis, policies and procedures relevance and utilisation, presentation and overall project management, consulting and technical/engineering consulting;
- Growth driven by multi-fold reasons across demand and supply-side - R&D facilities, knowledge, skills, a good network of research centres, educated and English-speaking human resources, need for timely and effective decision making, well-developed base industries and cost-effectiveness;
- Demand is being driven by an increasingly competitive market and changing demographics among the

Western countries – availability of skilled engineering workforce is on the decline;

- The ever-accelerating spread of new technologies in a competitive environment worldwide makes it imperative for identifying new ideas and technologies at their source in the scientific world, carried forward by technological research, innovation and piloted into commercial production–development phase; and
- The factors driving the growth include growing population and improving incomes, emerging lifestyle changes, increasing investment in infrastructure and R&D, both by public and private sectors, increasing outsourcing opportunities in the manufacturing etc.

➔ **Consulting market segments**

The GoB consulting industry can be divided into two distinct segments – consulting services and consulting support services, and their description is detailed in **Exhibit No. 11.8**.



## Exhibit No. 11.8: Bangladesh consulting market segments

Consulting services	Consulting support services
<ul style="list-style-type: none"> <li>• Management consulting</li> <li>• Engineering/technical consulting</li> </ul>	<ul style="list-style-type: none"> <li>• Research and analytics</li> <li>• Business intelligence</li> <li>• Technical analysis</li> <li>• Legal, accounting, policies and procedures, and regulations</li> <li>• Liasoning</li> </ul>

Source: MACE analysis

### ➔ Research and analytics

Research in a business context is a systematic and organised effort to investigate a specific problem encountered in the work setting that needs a solution. It is a systematic and objective process of gathering, recording and analysing data for aid in making business decisions.

Analytics is a field of data analysis. Analytics often involves studying past historical data to research potential trends, to analyse the effects of certain decisions or events, or to evaluate the performance of a given tool or scenario. The goal of analytics is to improve the business by gaining knowledge which can be used to make improvements or changes.

Research and analytics firms provide a plethora of services in this domain. The major chunk of the work comes from investment research, market research, consumer insights, and supply chain analytics.

### ➔ Business intelligence

While research provides insights from what has already happened, intelligence is about proposing future trends. Business intelligence services providers develop new opportunities by analysing information and finding insights.

This area is focused on conducting market sizing, forecasting sales, trends and drivers, competitive intelligence to drive own firm strategy and make implementable action plans to provide a competitive market advantage and long-

term stability within the organisation's industry. Most sought after intelligence service is market sizing assignments.

### ➔ Technical analysis

This area involves service providers operating in a very niche segment either by industry practice or functional area or both. Technical analysis is a very specialised service offered to client organisations.

### ➔ Legal, accounting, policies and procedures, and regulations

This area is related to consultancy services on legal aspects, accounting systems, regulation, and policies and procedures of business in Bangladesh. Most common service is pertaining to regulatory and policy aspects. This is followed by corporate law and M&A.

### ➔ Liaison activities

Liaison activities is a very specialised service provided by many consultancy services providers in Bangladesh. It basically involves the co-ordination of one entity with others in order to achieve the desired outcome.

Liaison services are desirable for foreign companies intending to do business in Bangladesh but want to open a small liaison office only, which would co-ordinate with different offices of the company across the globe and Bangladesh stakeholders/client.

Liaison is also desirable in co-ordination with various Govt. agencies and private companies in Bangladesh as well regarding various issues like license procurement, land clearances, etc.

### ➤ Management consulting

Management consulting is the practice of helping organisations to improve their performance, primarily through the analysis of existing organisational problems and development of plans for improvement. Consultancy service providers may also provide organisational change management assistance, development of coaching skills, technology implementation, strategy development, or operational improvement services.

Management consultants often bring their own proprietary methodologies or frameworks to guide the identification of problems and to serve as the basis for recommendations for more effective or efficient ways of performing work tasks.

### ➤ Engineering consulting

Engineering consulting is an area of consulting services which involves assistance to the clients on design and construction needs. The work of engineering consulting firms is varied. Because engineering is such a wide field, there is almost no limit to the work a consultant can perform. The typical services in engineering consulting sector are given in **Table No. 11.2**.

Table No. 11.2: Typical services in Bangladesh engineering consulting sector (not exhaustive)

<i>Expertise areas / sectors of operation</i>	<i>Concept planning</i>	<i>Engineering investigations, studies</i>	<i>Architecture and planning</i>	<i>Ground Engineering, ground improvement</i>	<i>Market demand assessment &amp; forecast</i>	<i>Feasibility studies, detailed project report</i>	<i>Master planning</i>	<i>Environment analysis, environmental impact, sustainability studies</i>	<i>Sourcing of technology suppliers, identification of joint venture partners</i>	<i>PPP &amp; SPV modelling for infrastructure projects</i>	<i>Procurement advisory, transaction advisory PPP, bid process management</i>	<i>Design and detail engineering</i>	<i>Project and program management</i>	<i>Statutory &amp; regulatory compliance</i>	<i>Pre-commissioning trials, performance &amp; acceptance testing, third party inspection</i>	<i>Operation &amp; maintenance studies and support</i>	<i>Capacity building and training, knowledge partner services</i>
Industrial infrastructure	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Water and wastewater sector	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Urban infrastructure – water supply, sewerage, municipal SWM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Urban transportation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Energy	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	
Tourism infrastructure	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Transportation sector	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Environment and sustainability studies	*	*		*		*	*	*	*	*	*	*	*	*	*	*	*
Industrial plants and systems, buildings, facilities, utilities	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	
Agri and rural infrastructure	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Social infrastructure	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Source: MACE analysis

Generally, civil engineering for the last few decades has not been considered as an attractive option compared to other engineering branches. Absence of specialised infrastructure engineering education and inadequate course curriculum coverage has a serious impact in offering world-class engineering services for infrastructure projects. As a result, Bangladesh companies are in the lookout for International infrastructure consulting firms, especially in the area of urban transport systems, international airport terminals, port and marine infrastructure etc.

Hence huge potential exists for building up consultancy capabilities in infrastructure engineering.

*11.3.10 Thrust segments of the consulting sector from IRC-IDC perspective*

**Exhibit No. 11.9** shows the thrust segments of the consulting sector in Bangladesh. The positioning of the IRC-IDC shall take into account the thrust segments of Bangladesh consulting sector.

**Exhibit No. 11.9: Thrust segments of consulting and consulting support services in the context of IRC-IDC**



Source: MACE analysis

**11.4. IRC-CoE: focus, size, infrastructure proposed and likely occupant units**

Table No. 11.3 highlights the focus of IRC-CoE infrastructure planned, likely occupant units etc.

Table No. 11.3: Details of IRC – CoE for life sciences

Development node focus	Life sciences
Major subsectors proposed in the IRC-CoE	<ul style="list-style-type: none"> <li>• <b>Agricultural biotechnology</b> <ul style="list-style-type: none"> <li>▪ Hybrid seeds</li> <li>▪ Biopesticides</li> <li>▪ Bio fertilisers</li> <li>▪ Plant extractions</li> <li>▪ Transgenic plants</li> <li>▪ Plant molecular biology</li> </ul> </li> <li>• <b>Health care and enzyme technology</b> <ul style="list-style-type: none"> <li>▪ Cancer biology</li> <li>▪ Cardiovascular genetics</li> <li>▪ Vascular biology</li> <li>▪ Molecular virology</li> <li>▪ Stem cells proliferation</li> <li>▪ Vaccines/gene therapy/diagnostics</li> </ul> </li> <li>• <b>Aquaculture and marine biotechnology</b> <ul style="list-style-type: none"> <li>▪ Structural and functional genomics</li> <li>▪ Marine pharmaceuticals</li> <li>▪ Marine bio-materials</li> <li>▪ Novel enzymes, biosensors</li> <li>▪ Fish transgenic for therapeutics</li> </ul> </li> <li>• <b>Computational biology</b> <ul style="list-style-type: none"> <li>▪ Molecular computation</li> <li>▪ Computational neuroscience</li> <li>▪ Structure-based drug discovery</li> </ul> </li> <li>• <b>Industrial biotechnology</b> <ul style="list-style-type: none"> <li>▪ Industrial enzymes</li> <li>▪ Biopolymers</li> <li>▪ Biofuels</li> <li>▪ Fermentation products</li> <li>▪ Energy – Ethanol, methane and hydrogen</li> </ul> </li> <li>• <b>Bioprocess engineering</b> <ul style="list-style-type: none"> <li>▪ Applied microbiology and industrial biotechnology</li> <li>▪ Cellular engineering for enhanced bioprocess productivity</li> <li>▪ Bioreactor engineering</li> </ul> </li> <li>• <b>Environmental Technology</b> <ul style="list-style-type: none"> <li>▪ Bioremediation/biodegradation</li> <li>▪ Phytoremediation</li> <li>▪ Mycorrhizosphere bioremediation</li> <li>▪ Effluent and waste management</li> <li>▪ Biosensors</li> </ul> </li> <li>• <b>Waste technology</b> <ul style="list-style-type: none"> <li>▪ Composting</li> <li>▪ Technology for waste to energy</li> <li>▪ Conservation and recycling</li> </ul> </li> </ul>
Multi formatted options	Fully furnished captive built-in space, partially furnished captive built-in space, bare shell structure to facilitate customised requirements etc

The extent of built-up space	500 sq.m
Infrastructure development available for the IRC-CoE	<p>Internal pathways, pavements, e-vehicle movements, site grading, drainage system, water supply, sewerage network, STP, SWM, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities, etc.</p> <p>The specific and specialised infrastructure facilities of generic nature shall be provided based on the occupant units of IRC-CoE requirements.</p>
Likely occupant units	<ul style="list-style-type: none"> <li>• Agricultural biotechnology;</li> <li>• Health care and enzyme technology;</li> <li>• Aquaculture and marine biotechnology;</li> <li>• Computational biology;</li> <li>• Industrial biotechnology;</li> <li>• Bioprocess engineering;</li> <li>• Environmental technology; and</li> <li>• Waste technology.</li> </ul>
Project implementation mode for IRC-CoE infrastructure components	TKZC:SPV shall establish the IRC-CoE and including specific and specialised infrastructure facilities. The detailed discussion of project implementation mode for IRC-CoE infrastructure components is covered in a sperate chapter.
Occupant units	Interior development and company-specific infrastructure shall be established by the occupant units of IRC-CoE

Source: MACE analysis

Table No. 11.4: Details of IRC –CoE for alternative and renewable energy

Development node focus	Alternative and renewable energy
Major subsectors proposed in the IRC-CoE	<ul style="list-style-type: none"> <li>• Solar PV;</li> <li>• Solar Concentrating solar power (CSP);</li> <li>• Hydrogen energy;</li> <li>• Fuel cells;</li> <li>• Fuels from sunlight;</li> <li>• Electric and hybrid electric vehicles;</li> <li>• Geothermal energy and tidal energy;</li> <li>• Biomass utilisation;</li> <li>• Waste to energy technologies;</li> <li>• Batteries and energy storage;</li> <li>• Energy efficiency; and</li> <li>• Carbon capture and storage.</li> </ul>
Multi formatted options	Fully furnished captive built-in space, partially furnished captive built-in space, bare shell structure to facilitate customised requirements etc
The extent of built-up space	300 sq.m
Infrastructure development available for the IRC-CoE	Internal pathways, pavements, e-vehicle movements, site grading, drainage system, water supply, sewerage network, STP, SWM, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities etc.

	The specific and specialised infrastructure facilities shall be provided based on the occupant units of IRC-CoE requirements.
Likely occupant units	<ul style="list-style-type: none"> <li>• Renewable energy product development companies;</li> <li>• Renewable energy research companies;</li> <li>• Renewable energy technology providers;</li> <li>• Integrated design, verification, and modelling companies; and</li> <li>• Components, diagnostics, sub-systems, and controls companies.</li> </ul>
Project implementation mode for IRC-CoE infrastructure components	TKZC:SPV shall establish the IRC-CoE and including specific and specialised infrastructure facilities
Occupant units	Interior development and company-specific infrastructure shall be established by the occupant units of IRC-CoE

*Source: MACE analysis*

**Table No. 11.5: Details of IRC – CoE for environmental technologies and sustainable business practices**

Development node focus	Environment technologies and sustainable business practices
Major subsectors proposed in the IRC-CoE	<ul style="list-style-type: none"> <li>• Water;</li> <li>• Wastewater;</li> <li>• Waste management;</li> <li>• Clean environmental technologies;</li> <li>• CDM;</li> <li>• Lifecycle assessment;</li> <li>• Environmental governance; and</li> <li>• Environmental compliance and sustainability reporting.</li> </ul>
Multi formatted options	Fully furnished captive built-in space, partially furnished captive built-in space, bare shell structure to facilitate customised requirements etc
The extent of built-up space	300 sq.m
Infrastructure development available for the IRC-CoE	Internal pathways, pavements, e-vehicle movements, site grading, drainage system, water supply, sewerage network, STP, SWM, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities etc.  The specific and specialised infrastructure facilities of generic nature shall be provided based on the occupant unit's requirements.
Likely occupant units	<ul style="list-style-type: none"> <li>• Environmental technologies companies;</li> <li>• Water and wastewater technologies companies;</li> <li>• Carbon management companies;</li> <li>• Specialist environmental services; and</li> <li>• Environmental and sustainability research organisations.</li> </ul>
Project implementation mode for IRC infrastructure components	TKZC:SPV shall establish the IRC-CoE and including specific and specialised infrastructure facilities *
Occupant units	Interior development and company-specific infrastructure shall be established by the occupant units of IRC-CoE

*Source: MACE analysis*

Table No. 11.6: Details of IRC- CoE for innovative materials and innovative products

<b>Development node focus</b>	Innovative materials and innovative products
<b>Major subsectors proposed in the IRC-CoE</b>	<ul style="list-style-type: none"> <li>• Power electronics materials, devices and integrated systems;</li> <li>• Grid materials, devices and systems;</li> <li>• Ceramics;</li> <li>• Chemicals;</li> <li>• Polymers;</li> <li>• Superalloys;</li> <li>• Semi-conductors;</li> <li>• Medical bio-materials;</li> <li>• Nanomaterials;</li> <li>• Bio-materials; and</li> <li>• Advanced processes and computation.</li> </ul>
<b>Multi formatted options</b>	Fully furnished captive built-in space, partially furnished captive built-in space, bare shell structure to facilitate customised requirements etc.
<b>The extent of built-up space</b>	300 sq.m
<b>Infrastructure development available for the IRC-CoE</b>	<p>Internal roads, site grading, drainage system, water supply, sewerage network, industrial trade effluent network, STP, ETP, SWM, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, utilities, common amenities, etc.</p> <p>The specific and specialised infrastructure facilities of generic nature shall be provided based on the occupant unit's requirements.</p>
<b>Likely occupant units</b>	<ul style="list-style-type: none"> <li>• Advanced process technologies companies; and</li> <li>• Companies engaged in aged a science, engineering and medicine, organic and organic materials, metals, semiconductors, superconductors, ceramics, glasses, ferroelectrics, low and high-k dielectrics, sol-gel materials, liquid crystals, bio-materials, organics and polymers, their based electronics, optics, photonics and biological devices.</li> </ul>
<b>Project implementation mode for IRC-CoE infrastructure components</b>	TKZC:SPV shall establish the IRC and including specific and specialised infrastructure facilities
<b>Occupant units</b>	Interior development and company-specific infrastructure shall be established by the occupant units

*Source: MACE analysis*

Table No. 11.7: Details of IRC – CoE for built environment and sustainable communities

<b>Development node focus</b>	Built environment and sustainable communities
<b>Major subsectors proposed in the IRC-CoE</b>	<ul style="list-style-type: none"> <li>• Structures research;</li> <li>• Material research;</li> <li>• Sustainable materials and technologies;</li> <li>• Architectural design research;</li> <li>• Construction and project management;</li> <li>• Energy-efficient building systems design;</li> <li>• Indoor environmental quality;</li> <li>• The showcase of innovative construction and technologies; and</li> </ul>



	<ul style="list-style-type: none"> <li>• Building performance and evaluation.</li> </ul>
Multi formatted options	Developed land, fully furnished captive built-in space, partially furnished captive built-in space, bare shell structure to facilitate customised requirements etc
The extent of built-up space	500 sq.m
Infrastructure development available for the IRC-CoE	<p>Internal pathways, pavements, e-vehicle movements, site grading, drainage system, water supply, sewerage network, STP, SWM, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities etc.</p> <p>The specific and specialised infrastructure facilities of generic nature shall be provided based on the occupant unit's requirements.</p>
Likely occupant units	<ul style="list-style-type: none"> <li>• Technical research and engineering companies;</li> <li>• Affordable housing and smart communities technology companies;</li> <li>• Environmental and building science services;</li> <li>• Acoustic and vibration specialists; and</li> <li>• Green and energy efficiency certification companies.</li> </ul>
Project implementation mode for IRC-CoE infrastructure components	TKZC:SPV shall establish the IRC-CoE and including specific and specialised infrastructure facilities
Occupant units	Interior development and company-specific infrastructure shall be established by the occupant units

*Source: MACE analysis*

### 11.5. IRC-IDC: focus, size, infrastructure proposed and likely occupant units

Table No. 11.8 highlights the focus of IRC-IDC, infrastructure planned, likely occupant units, etc.

**Table No. 11.8: Details of IRC – IDC**

Development node focus	Design, engineering, technical, consulting, advisory and research services
Major product design domain areas proposed in the IRC-IDC	Automotive, aerospace, chemicals, oil and gas, marine and offshore, consumer electronics, renewable energy, pharmaceuticals, medical devices, minerals and metals, material handling, food processing, industrial machinery appliances, equipment, industrial piping, HVAC
Major project design domain areas proposed in the IRC-IDC	<ul style="list-style-type: none"> <li>• Industrial infrastructure;</li> <li>• Water and wastewater sector;</li> <li>• Urban infrastructure - water supply, sewerage, municipal SWM;</li> <li>• Urban transportation;</li> <li>• Energy;</li> <li>• Tourism infrastructure;</li> <li>• Transportation sector;</li> <li>• Environment and sustainable business practices;</li> <li>• Industrial plants and systems, buildings, facilities, utilities;</li> <li>• Agri and rural infrastructure; and</li> <li>• Social infrastructure.</li> </ul>
Product design services	<ul style="list-style-type: none"> <li>• Styling and concept design;</li> </ul>

	<ul style="list-style-type: none"> <li>• Prototyping;</li> <li>• Product integration and testing;</li> <li>• Product conceptualisation;</li> <li>• Product design, analysis;</li> <li>• Verification and validation;</li> <li>• Design and development;</li> <li>• Embedded system design;</li> <li>• FEM calculation;</li> <li>• Risk &amp; hazard analysis;</li> <li>• Regulatory compliance &amp; product certification;</li> <li>• Design transfer for manufacturing;</li> <li>• Maintenance/sustenance engineering;</li> <li>• Value engineering;</li> <li>• Asset information management &amp; engineering process support using cutting-edge CAD/CAM/CAE technology;</li> <li>• Virtual validation;</li> <li>• Manufacturing support;</li> <li>• Staffing solutions; and</li> <li>• Plant and construction engineering.</li> </ul>
<p>Project design and engineering, consulting and advisory services</p>	<ul style="list-style-type: none"> <li>• Business intelligence <ul style="list-style-type: none"> <li>▪ Market sizing</li> <li>▪ Predicting the trend</li> <li>▪ Opportunity identification</li> <li>▪ Market forecasting studies</li> <li>▪ Benchmarking studies</li> <li>▪ Competitive intelligence</li> <li>▪ Predicting future market shares</li> </ul> </li> <li>• Technical analysis <ul style="list-style-type: none"> <li>▪ Valuation services</li> <li>▪ Corporate finance advisory</li> <li>▪ Strategic cost management</li> <li>▪ M&amp;A transaction services</li> <li>▪ Post-merger integration</li> <li>▪ Alliances and JV</li> </ul> </li> <li>• Legal, accounting, policies and procedures, and regulations <ul style="list-style-type: none"> <li>▪ Capital markets &amp; securities laws</li> <li>▪ Corporate law</li> <li>▪ Dispute resolution</li> <li>▪ Regulatory and policy</li> <li>▪ Taxation</li> <li>▪ I.P matters</li> <li>▪ Litigation and arbitration</li> <li>▪ Antitrust, unfair competition and trade practices</li> </ul> </li> <li>• Liaison <ul style="list-style-type: none"> <li>▪ Co-ordination between government offices and companies</li> <li>▪ Corporate liaison</li> <li>▪ Business partnership services</li> </ul> </li> <li>• Management consulting <ul style="list-style-type: none"> <li>▪ Corporate strategy and portfolio management</li> <li>▪ Public policy, behaviour and economics</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>▪ Business plans</li> <li>▪ Change management</li> <li>▪ Supply chain strategy</li> <li>▪ Expansion plans</li> <li>▪ Go-to-market strategy</li> <li>▪ Innovation</li> <li>• Engineering/technical consulting <ul style="list-style-type: none"> <li>▪ Feasibility studies</li> <li>▪ Techno-economic studies</li> <li>▪ Conceptual studies and concept planning</li> <li>▪ Architecture and planning</li> <li>▪ Process design and engineering</li> <li>▪ Plant engineering</li> <li>▪ Front end engineering</li> <li>▪ Detailed engineering</li> <li>▪ Cost estimation</li> <li>▪ Project implementation services</li> <li>▪ Procurement assistance</li> <li>▪ Program management</li> <li>▪ Project and construction management</li> <li>▪ Procurement assistance</li> </ul> </li> <li>• Research and analytics <ul style="list-style-type: none"> <li>▪ Consumer insights</li> <li>▪ Market research</li> <li>▪ Social media intelligence</li> <li>▪ Partner due diligence</li> <li>▪ Industry analysis</li> <li>▪ Opportunity analysis</li> <li>▪ Investment research</li> <li>▪ Feasibility analysis</li> <li>▪ I.P searches and analytics</li> <li>▪ Pricing and promotional activities</li> </ul> </li> </ul>
Multi formatted options	Fully furnished captive built-in space, partially furnished captive built-in space, bare shell structure to facilitate customised requirements etc.
The extent of built-up space	900 sq.m
Infrastructure development available for the IRC-IDC	<p>Internal pathways, pavements, e-vehicle movements, site grading, drainage system, water supply, sewerage network, STP, SWM, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities, etc.</p> <p>The specific and specialised infrastructure facilities of generic nature shall be provided based on the occupant unit's requirements.</p>
Likely occupant units	<ul style="list-style-type: none"> <li>• Product design</li> <li>• Project design and engineering</li> <li>• Management consulting</li> <li>• Engineering/technical consulting</li> <li>• Research and analytics</li> <li>• Business intelligence</li> <li>• Technical analysis</li> </ul>

	<ul style="list-style-type: none"> <li>• Legal, accounting, policies and procedures, and regulations</li> <li>• Liaison</li> </ul>
<b>Project implementation mode for IRC-IDC infrastructure components</b>	TKZC:SPV shall establish the IRC-IDC and including specific and specialised infrastructure facilities. The detailed discussion of project implementation mode for IRC-IDC infrastructure components are covered in a sperate chapter
<b>Occupant units</b>	Interior development and company-specific infrastructure shall be established by the occupant units

*Source: MACE analysis*

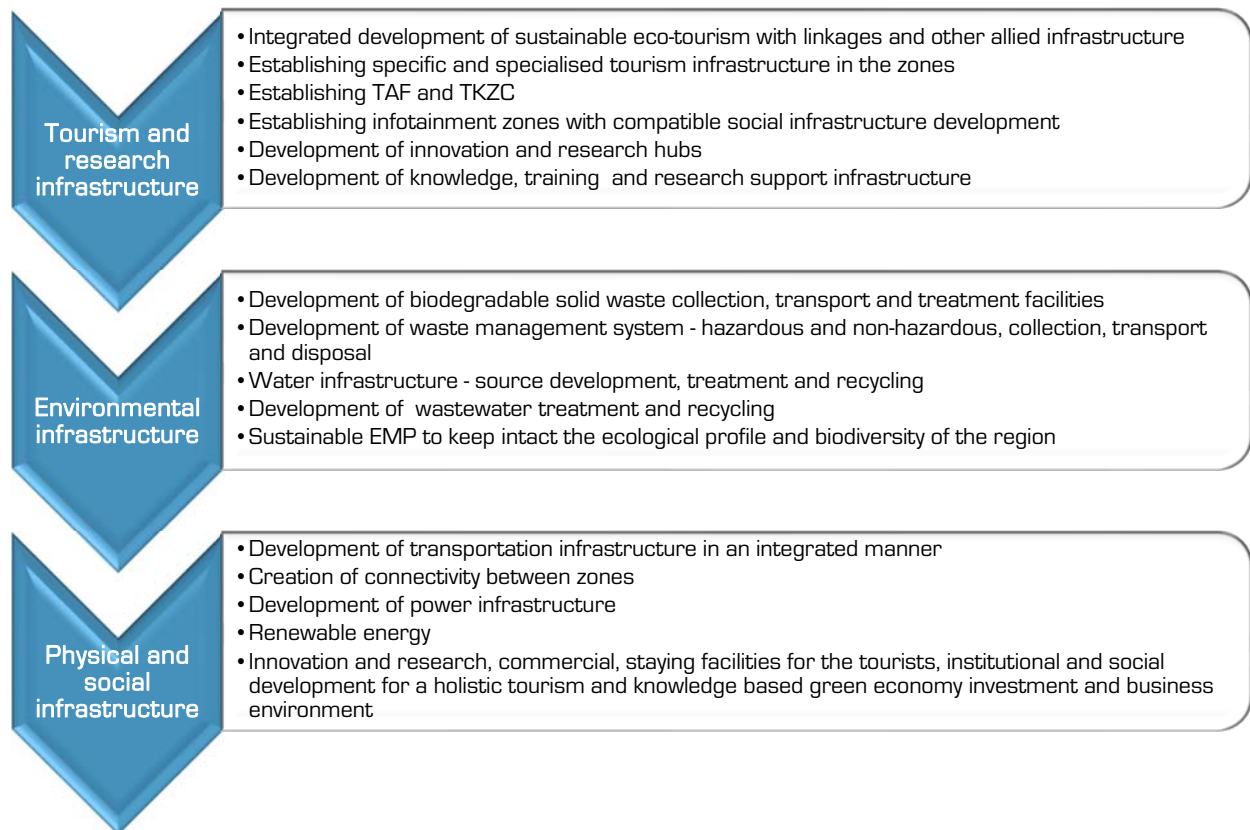
## Chapter - 12

# Infrastructure plan within SE-TP including IRC-CoE&IDC

### 12.1. Purpose and objectives of the infrastructure plan

The tourism, research, environmental, physical and social infrastructure objectives of SE-TP including IRC-CoE&IDC, are described in [Exhibit No. 12.1](#).

Exhibit No. 12.1: SE-TP including IRC-CoE&IDC infrastructure objectives



*Source: MACE analysis*

Provision of infrastructure and facilities is crucial for the sustained development and operation of SE-TP and for the occupant units of IRC-CoE&IDC. Identification and planning of various supporting infrastructure and facilities for establishing SE-TP, including IRC-CoE&IDC, constitute critical tasks. Accordingly, the chapter presents the details of SE-TP common

infrastructure, including specialised tourism infrastructure but outside the periphery of earmarked TKZC zone. Also, the chapter presents the details of TKZC common structure, TAF and other facilities within the periphery of earmarked TKZC zone. The various supporting infrastructure and facilities in the context of IRC-CoE&IDC for creating a campus of excellence are

identified based on the findings of the study. The common infrastructure facilities of SE-TP, TKZC common structure, TAF and other facilities, IRC-CoE&IDC shall be regularly maintained and continuously upgraded to be globally competitive.

The chapter dwells on SE-TP common infrastructure facilities which are grouped under following major heads;

- General infrastructure covering boundary wall and fencing; roads; NMT; bicycle movement; and pedestrian walkways; non-vehicle streets; smart parking; security and surveillance; robust IT connectivity and digitalisation; specific features for differently-abled;
- Social infrastructure covering training centre, incubation centre; commercial infrastructure zone; utility and support infrastructure zone; innovative use of open space and visible improvement;
- Environmental and green infrastructure covering water treatment; adequate water supply including wastewater recycling and stormwater reuse; drainage; rainwater harvesting; sewerage network; sewage treatment and wastewater recycling infrastructure; sanitation including SWM; composting and environment/pollution abatement structures; assured electricity supply; renewable energy; waste to energy; site energy utilisation; energy-efficient street lighting; and
- Specialised tourism infrastructure.

The chapter also dwells on IRC-CoE&IDC infrastructure. The SE-TP connectivity and external infrastructure are dealt with in a separate chapter.

## 12.2. Standards and codes for infrastructure planning

To create an ideal ambience and best environment within SE-TP, including IRC-CoE&IDC, provision of appropriate infrastructure facilities for the development is necessary. Also, it is imperative to improve the overall quality of products and services within the tourism industry [all tourism-related accommodation, restaurants,

tour guides, tour operators, and other tourism-related service providers]; raise the levels of demand nationally, regionally and internationally; promote competitiveness within the industry; and, provide valuable and reliable information on quality standards for the tourist and the travel industry.

The chapter elaborately details the design considerations for infrastructure planned within SE-TP, including IRC-CoE&IDC. The compliance shall be made to relevant Bangladesh and international standards:

- British Standards
- European Standards
- National and Regional applicable Standards
- International Building codes (latest edition)
- LEED principles
- International Mechanical Code (latest edition)
- International Energy Conservation Code (latest edition)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers
- American National Standards Institute
- Sheet Metal and Air Conditioning Contractors National Association
- American Society for Testing and Materials
- International Standard Organisation (ISO)
- World Bank environmental and social framework (2016)
- UNIDO (AI/2017/04)
- Vienna Convention for the protection of the ozone layer (September 1988) and the Montreal protocol for control of substances that deplete the ozone layer (1987)
- Basel Convention on the prevention of trans-boundary movement of hazardous wastes and their disposal (May 1992)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (July 1975)
- Convention on Bio-diversity – United Nations Environment Programme (December 1993)

- United Nation Framework Convention on climate change (1992)
- United Nation Convention to Combat Desertification (1996)
- Stockholm Convention on Persistent Organic Pollutants (May 2004)
- World Health Organisation (WHO) Health and Safety Component of EIA, 1987
- Sustainable tourism for development guidelines of UNWTO, indicators of sustainable development for tourism destinations developed by UNWTO, Policies, Strategies and Tools for the Sustainable Development of Tourism

issued by UNWTO shall be taken into consideration.

- Further, the Global Sustainable Tourism Council (GSTC) criteria for destinations and hotels (tour operators) also shall be taken into consideration.

### 12.3. Considerations for infrastructure plans

The basic considerations and the methodology adopted for planning various infrastructure components within the SE-TP are provided in [Table No. 12.1](#).

**Table No. 12.1: Details of components covered under the infrastructure plan**

Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
A. Roads/driveways – general considerations	<ul style="list-style-type: none"> <li>○ Embankment cum road is proposed all along the periphery of the development area; and</li> <li>○ The spinal road and internal NMT driveways are well integrated and well planned to ensure internal movement within the SE-TP through NMT modes such as walking, cycling and e-car.</li> </ul>
B. Roads – categories	<ul style="list-style-type: none"> <li>○ Embankment cum road and internal driveways of 7.5 m wide and 5.5 m wide respectively are proposed within the SE-TP.</li> </ul>
C. Pedestrian walkways and bicycle movement	<ul style="list-style-type: none"> <li>○ The project shall have walkable paths;</li> <li>○ Internal driveways and pedestrian walkways are provided for easy movement of visitors with sufficient care so that no transport system comes in the way of pedestrians;</li> <li>○ Aesthetically designed walkways are provided along with lush green environment on either side of the road;</li> <li>○ Pedestrian walkways are provided for all categories of roads;</li> <li>○ A network of bicycle lanes are provided to promote cycling as a means of transport;</li> <li>○ Bicycle lane network within the SE-TP site area to connect to all main buildings and basic amenities;</li> <li>○ Bicycle parking at all important structures, TAF, main buildings/ basic amenities, within walking distance;</li> <li>○ Necessary multilingual signage, name boards, zone guiding maps and visitor's guidance map, etc., are planned to be positioned at necessary locations, such as intersections and at various strategic locations in each zone; and</li> <li>○ NMT is the only mode of transport proposed to be used within the SE-TP.</li> </ul>
D. NMT-pavement structure	<ul style="list-style-type: none"> <li>○ In the proposed SE-TP, paver block driveway has been proposed for the internal movement via NMT mode of transport such as walking, cycling and e-car.</li> </ul>
E. Surface drainage – general considerations	<ul style="list-style-type: none"> <li>○ Based on the topography of the SE-TP, the drainage pattern has been decided;</li> </ul>

Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
	<ul style="list-style-type: none"> <li>○ To prevent the entry of stormwater runoff from adjacent areas/ water intrusion from the adjacent channel, an embankment all along the periphery of the development area is considered; and</li> <li>○ The internal drains are well planned according to the contour of the planning area.</li> </ul>
F. Surface drainage – peak runoff	<ul style="list-style-type: none"> <li>○ The peak run-off and discharge capacities are computed based on the following design parameters; <ul style="list-style-type: none"> <li>● The peak run-off is planned to be computed based on the rational formula: - <math display="block">Q = C * I * A / 360</math> Where, Q = Quantity of runoff, m<sup>3</sup>/s  C = Coefficient of runoff  I = Intensity of rainfall, mm/hr  A = Catchment area, hectare </li> <li>● Considering the nature of the soil/surface, the coefficient of runoff adopted in the drainage computation are:  0.9 - for built-up area  0.5 - for road and other paved areas  0.2 - for greenery and open area</li> </ul> </li> </ul>
G. Surface drainage – sizing	<ul style="list-style-type: none"> <li>● The sizing of the drains shall be designed based on the discharge capacity of Q<sub>c</sub> to cater adequately to the estimated peak runoff using Manning's formula: <math display="block">Q_c = (1/n) * A * R^{2/3} * S^{1/2} \text{ (m}^3\text{/sec)}</math> Where  A = Area of a cross-section of the drain (m<sup>2</sup>)  R = Hydraulic mean radius (m)  S = Hydraulic gradient  n = roughness coefficient</li> </ul>
H. Surface drainage – design & scheme	<ul style="list-style-type: none"> <li>○ From the contour, it is observed that the site is elevated on the West and is sloping towards the Eastern side;</li> <li>○ Hence, it is planned to propose the drain along the inner edge of the embankment cum road and is planned to discharge into the existing water channel through collection sump and pumping system;</li> <li>○ The internal drainage system is planned to cater for the entire park through gravity flow;</li> <li>○ An open trapezoidal drain is considered for the surface runoff collection due to easy maintenance;</li> <li>○ It is recommended not to directly discharge the collected stormwater into the water channel, since, it will have backflow. Hence, the collection sump with a pumping system has been proposed to discharge the stormwater;</li> <li>○ Enhancing the groundwater table and reduce water demand through effective rainwater management;</li> <li>○ Rainwater harvesting through recharging structures are envisaged all along the drain at regular intervals, apart from individual rainwater harvesting through recharging structures at strategic locations; and</li> <li>○ Rainwater harvesting structures are envisaged all along the drain at every 200 m interval.</li> </ul>
I. Water demand	<ul style="list-style-type: none"> <li>○ The project shall have 24x7 treated water supply adopting national and global standards with sufficient quantity. Unaccounted loss shall be less than 15%;</li> </ul>



Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC																																								
	<ul style="list-style-type: none"> <li>○ For tourism, TAF, IRC-CoE&amp;IDC requirements, bathing and washing clothes, cooking, drinking and washing vessels, the proposal contemplates the use of potable water;</li> <li>○ The usage of non-potable water includes gardening, cleaning, cooling and toilet flushing;</li> <li>○ The norms of estimating the water requirements for other usages are shown in <a href="#">Table No. 12.2</a>.</li> </ul> <p style="text-align: center;"><b>Table No. 12.2: Water demand estimation norms and assumptions</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Description</th> <th>Reference – published standards, guidelines and best industry norms</th> </tr> </thead> <tbody> <tr><td>Internal road/path</td><td>1.8 cum/ hectare/day</td></tr> <tr><td>Green/landscaping/garden/park</td><td>4.53 cum/ hectare/day</td></tr> <tr><td>Office area/institutional buildings</td><td>45 Litres per capita per day (LPCD)</td></tr> <tr><td>Star hotel/budget hotel</td><td>180 litres per key</td></tr> <tr><td>Themed pavilion/viewing deck/oceanarium</td><td>15 LPCD</td></tr> <tr><td>Restaurant</td><td>70 litres per seat</td></tr> <tr><td>Hotel</td><td>180 litres per key</td></tr> <tr><td>Golf-course</td><td>3.2 cum/ hectare/ day</td></tr> <tr><td>Cottages/resorts/villas</td><td>135 LPCD</td></tr> <tr><td>Gallery/open air theatre/pavilion/MICE/convention centre</td><td>15 LPCD</td></tr> <tr><td>Wet rides</td><td>100 - 750 cum</td></tr> <tr><td>Dry rides</td><td>15 LPCD</td></tr> <tr><td>Green house</td><td>20 cum/hectare/day</td></tr> </tbody> </table> <p><i>Source: MACE analysis, published standards, guidelines and best industry norms</i></p> <ul style="list-style-type: none"> <li>○ <a href="#">Table No. 12.3</a> depicts the water consumption pattern for potable and non-potable water.</li> </ul> <p style="text-align: center;"><b>Table No. 12.3: Water consumption pattern</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #0070C0; color: white;">For areas with bathing facilities</th> </tr> </thead> <tbody> <tr><td>Potable water</td><td>70%</td></tr> <tr><td>Non-potable water</td><td>30%</td></tr> <tr> <th colspan="2" style="background-color: #0070C0; color: white;">For areas without bathing facilities</th> </tr> <tr><td>Potable water</td><td>55%</td></tr> <tr><td>Non-potable water</td><td>45%</td></tr> </tbody> </table> <p><i>Source: MACE analysis, published standards, guidelines and best industry norms</i></p>	Description	Reference – published standards, guidelines and best industry norms	Internal road/path	1.8 cum/ hectare/day	Green/landscaping/garden/park	4.53 cum/ hectare/day	Office area/institutional buildings	45 Litres per capita per day (LPCD)	Star hotel/budget hotel	180 litres per key	Themed pavilion/viewing deck/oceanarium	15 LPCD	Restaurant	70 litres per seat	Hotel	180 litres per key	Golf-course	3.2 cum/ hectare/ day	Cottages/resorts/villas	135 LPCD	Gallery/open air theatre/pavilion/MICE/convention centre	15 LPCD	Wet rides	100 - 750 cum	Dry rides	15 LPCD	Green house	20 cum/hectare/day	For areas with bathing facilities		Potable water	70%	Non-potable water	30%	For areas without bathing facilities		Potable water	55%	Non-potable water	45%
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J. Water losses	<ul style="list-style-type: none"> <li>○ The project shall have meters for all its water supply and distribution network. It includes a smart mechanism for remote monitoring;</li> <li>○ Rainwater harvesting systems are proposed to be installed and utilised;</li> <li>○ Supply of recycled wastewater for secondary uses; and</li> </ul>																																								

Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
	<ul style="list-style-type: none"> <li>o Water losses occur in the distribution and transmission network. The percentage of loss depends on the pipe material, joining the system. As this is a complete loss, it is attempted to keep these losses below 10% of the total demand.</li> </ul>
K. Fire protection demand - non-potable	<ul style="list-style-type: none"> <li>o Fire demand in litres per minute has been calculated based on the following formula:  <math display="block">Q_{FD} = 4000 \times (P)^{0.5} \times (1 - 0.01 \times (P)^{0.5})</math>           Where P = Population in thousands per hectare         </li> <li>o Considering two hours of fire demand requirement, the total quantity of water required for fire protection has been calculated; and</li> <li>o Demand for firefighting has not been considered under daily demand as one-time storage, i.e. 2 hours of fire demand will be created and maintained.</li> </ul>
L. Average water demand	<ul style="list-style-type: none"> <li>o Based on the computation and analysis, the total average water demand is estimated.</li> </ul>
M. Water storage	<ul style="list-style-type: none"> <li>o Based on the estimates, the following infrastructure for SE-TP is proposed;</li> <li>o Underground storage tank:           <ul style="list-style-type: none"> <li>• The total storage capacity of the underground storage tank is based on 24 hours duration. Storage requirement details are shown in Table-Underground sump storage capacity; and</li> <li>• UG storage sumps are individually proposed to store the potable and non-potable water demand, including fire demand for SE-TP.</li> </ul> </li> <li>o Elevated level storage reservoir (ELSR):           <ul style="list-style-type: none"> <li>• The total storage capacity of the OHT is based on 2 hours duration.</li> <li>• An ELSR for storing potable and non-potable water including fire demand by providing separate compartments within the tank for potable and non-potable water distribution; and</li> <li>• As per standard norms, the tail end should have a minimum residual pressure of 12.0 m. To meet the norms, the staging height of ELSR shall be fixed accordingly by the project implementation agency.</li> </ul> </li> </ul>
N. Water pumping station	<ul style="list-style-type: none"> <li>o The proposal includes a water pumping station for potable and non-potable water for pumping from the underground storage sump to respective ELSR;</li> <li>o The water supply scheme, including distribution, is planned based on the peak flow, minimum residual pressure, and pipe material.</li> </ul>
O. Water distribution network	<ul style="list-style-type: none"> <li>o It is proposed to provide a separate water distribution network for potable and non-potable supply;</li> <li>o The design criteria for the design of water supply network include:           <ul style="list-style-type: none"> <li>• Demand computed based on the analysis;</li> <li>• Working hours per day – 24;</li> <li>• Pipe material;               <ul style="list-style-type: none"> <li>▪ For pumping main – Ductile Iron (DI) (K9);</li> <li>▪ For distribution up to 200 mm diameter - High-density polyethylene (HDPE) (PE 100);</li> <li>▪ For distribution above 200 mm diameter - DI (K7);</li> <li>▪ Pipe roughness coefficient - 140 for DI and - 150 for HDPE;</li> <li>▪ The formula used for friction loss - Hazen Williams;</li> <li>▪ Minimum residual pressure at all tapping points - 12.0 m; and</li> <li>▪ ELSR staging height - as per design requirement.</li> </ul> </li> </ul> </li> </ul>

Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC															
P. Water treatment plant	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #0056b3; color: white;">Source</th> <th style="background-color: #0056b3; color: white;">Quality</th> <th style="background-color: #0056b3; color: white;">Process required</th> </tr> </thead> <tbody> <tr> <td>Groundwater with protected storage</td> <td>Low turbidity, free from colour and odour</td> <td>Plain chlorination</td> </tr> <tr> <td>Ground Water</td> <td>Having iron, turbidity, odour</td> <td>Aeration, coagulation, sand filtration and chlorination</td> </tr> <tr> <td>Pond, Lake with surface runoff</td> <td>Turbidity, suspended solids, algae</td> <td>Coagulation, sedimentation, sand filtration and chlorination</td> </tr> <tr> <td>Sea</td> <td>Saline</td> <td>Desalination</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>The system selected shall ensure that the quality of water is within the drinking water standards,</li> <li>For water treatment plant (WTP) with a source of water as storage tanks, coagulation, sand filtration, and chlorination are suggested</li> <li>For WTP at lake/riverside, coagulation, sedimentation, sand filtration and chlorination are suggested;</li> <li>For WTP with seawater intake, the desalination plant is suggested; and</li> <li>The study shall include the optimisation of the system depending on the actual quality of raw water.</li> </ul> <p><b><u>Typical WTP process flow diagram (to be finalised after testing the raw water quality)</u></b></p> <pre> graph TD     A[Raw water from borewell/lake] --&gt; B[Raw water collection tank]     B --&gt; C[Aeration]     C --&gt; D[Coagulation and Sedimentation]     D --&gt; E[Clarified water tank]     E --&gt; F[Filter feed pump]     F --&gt; G[Filtration system 1]     G --&gt; H[Filtration system 2]     H --&gt; I[Filtered water tank]     I --&gt; J[Disinfection]     J --&gt; K[Elevated level storage reservoir]     subgraph WTP         B         C         D         E         F         G         H         I         J     end     </pre>	Source	Quality	Process required	Groundwater with protected storage	Low turbidity, free from colour and odour	Plain chlorination	Ground Water	Having iron, turbidity, odour	Aeration, coagulation, sand filtration and chlorination	Pond, Lake with surface runoff	Turbidity, suspended solids, algae	Coagulation, sedimentation, sand filtration and chlorination	Sea	Saline	Desalination
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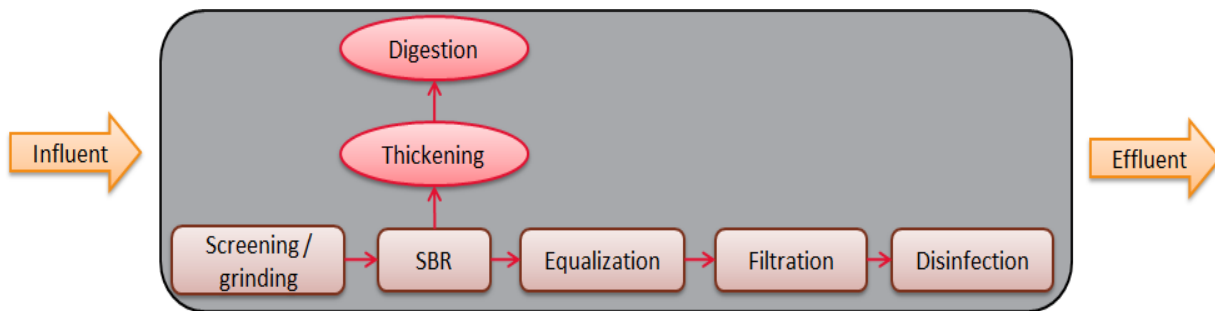
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<p>Q. Sewage quantity estimation</p>	<ul style="list-style-type: none"> <li>○ The sewerage system is planned to cater for the anticipated peak discharge requirements and to treat the waste to the required discharge standards;</li> <li>○ The estimation of the sewage shall vary depending upon the land use distribution;</li> <li>○ The domestic sewage to be generated has been assumed to be 80% of the domestic water consumption in addition to infiltration of 10%;</li> <li>○ The proposal includes handling of wastewater generated from toilets (considered as sewage) and the wastewater generated from bath/shower, laundry, hand basin, and kitchen (considered as sullage, greywater);</li> <li>○ Following design, criteria are proposed for sewerage, treated effluent collection system               <ul style="list-style-type: none"> <li>● Demand computed based on the analysis</li> <li>● Working hours per day - 24</li> <li>● Pipe material - NP2 RCC for all areas except road crossing and NP3 RCC for road crossing</li> <li>● Pipe roughness co-efficient - 0.011</li> <li>● Peak flow factor - 3</li> <li>● The formula used to calculate friction loss - Manning's</li> <li>● Infiltration - 10%</li> <li>● Self-cleansing velocity - 0.6 m/s</li> </ul> </li> <li>○ Minimum cover - 1 m               <ul style="list-style-type: none"> <li>● Utility hole spacing - 30 m up to pipe size 900 mm</li> </ul> </li> <li>○ The project shall have zero wastewater since all the wastewater is collected, treated and recycled;</li> <li>○ Each TAF/occupant unit will treat its effluent to sewage standards before discharge into the sewerage network;</li> <li>○ The activity includes a collection of treated effluent, sewage, and sullage through a single collection network based on the above design criteria. The project implementation company shall implement a sewerage network based on the topography of the site;</li> <li>○ Based on the natural topography and other site constraints, trunk main and sub-mains form part of the network. The sewerage network includes a minimum pipe size of 150 mm;</li> <li>○ The wastewater, sewage and sullage generation pattern is shown in <a href="#">Table No. 12.4</a> and <a href="#">Table No. 12.5</a>.</li> </ul>									
<b>Table No. 12.4: Wastewater generation pattern</b>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Description</th> <th style="width: 40%;">Percentage</th> </tr> </thead> <tbody> <tr> <td>Bath/shower and laundry</td> <td style="text-align: center;">55.97%</td> </tr> <tr> <td>Hand basin, kitchen</td> <td style="text-align: center;">12.29%</td> </tr> <tr> <td>Toilet</td> <td style="text-align: center;">31.74%</td> </tr> </tbody> </table>		Description	Percentage	Bath/shower and laundry	55.97%	Hand basin, kitchen	12.29%	Toilet	31.74%	
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<i>Source: MACE analysis, published standards, guidelines and best industry norms</i>										
<b>Table No. 12.5: Sewage and sullage generation pattern</b>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="background-color: #0070C0; color: white;">For areas without bathing and washing facility</th> </tr> </thead> <tbody> <tr> <td style="width: 50%;">Sewage</td> <td style="width: 10%; text-align: center;">=</td> <td style="width: 40%; text-align: center;">72.09%</td> </tr> <tr> <td>Grey water</td> <td style="text-align: center;">=</td> <td style="text-align: center;">27.91%</td> </tr> </tbody> </table>		For areas without bathing and washing facility			Sewage	=	72.09%	Grey water	=	27.91%
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Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC																										
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	<i>Source: MACE analysis, published standards, guidelines and best industry norms</i>																										
R. Quality of sewage	<ul style="list-style-type: none"> <li>Table No. 12.6 presents the general quality standards of domestic sewage generation;</li> </ul>																										
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	<ul style="list-style-type: none"> <li>However, the preceding condition is that occupant units treat the generated effluent to the required level of pre-treatment before discharging to a common system; and</li> <li>Based on this assumption of input quality, the design and treatment scheme has been worked out. It is proposed to treat both sewage and sullage in a single treatment system.</li> </ul>																										
S. STP considerations	<ul style="list-style-type: none"> <li>Sewage treatment is the process of removing contaminants from wastewater, comprising of storm run-off, domestic sewage and primary treated effluent. It includes physical, chemical and biological processes to remove various contaminants; and</li> <li>Table No. 12.7 and Exhibit No. 12.2 gives various sewerage treatment systems considered for selection of treatment system for SE-TP, including IRC-CoE&amp;IDC and STP process flow diagram respectively.</li> </ul>																										
	<b>Table No. 12.7: STP process and units</b>																										
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Components		Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC	
4	Trickling filters	Circular tanks with media, underdrain and secondary clarifier	Rotary distributor for influent and re-circulation pumps
5	Rotating Biological Contactors (RBC)	A trough with polyvinyl chloride / plastic discs, secondary clarifier	Drive mechanism for rotating the discs
6	Fluidised aerobic bioreactor	Reactor tank with polypropylene media and diffusers followed by a secondary clarifier	Blowers for the supply of oxygen through membrane diffusers
7	Sequencing Batch Reactor (SBR)	It uses deep RCC basins, and very efficient oxygen transfer equipment's (diffused aeration mechanism)	Diffusers, blowers and aeration grid, which provides the highest aeration and oxygen transfer efficiency. Decanter assembly in Stainless steel equipped with variable frequency drive to automatically control the rate of decanting based on input feed condition
8	Membrane Bio-Reactor (MBR)	Aeration tanks followed by balancing tank and membrane bioreactor	Diffusers, blowers to supply oxygen, air compressors for backwashing, chemical dosing for pre-treatment.

Source: MACE analysis

Exhibit No. 12.2: STP process flow diagram (SBR technology)

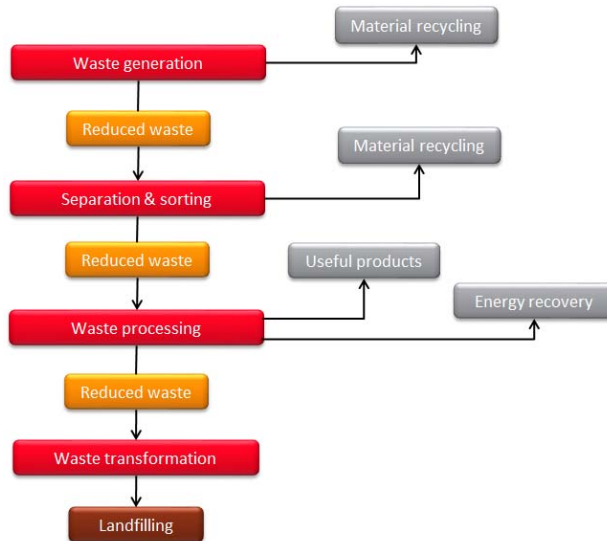


Source: MACE analysis

<p>T. Selection of technology for the sewage treatment plant</p>	<ul style="list-style-type: none"> <li>○ Factors considered for selection of appropriate treatment system:               <ul style="list-style-type: none"> <li>● Reliability;</li> <li>● Vector nuisance;</li> <li>● Area availability;</li> <li>● Power requirement;</li> <li>● Capital cost; and</li> <li>● O&amp;M cost.</li> </ul> </li> <li>○ The exercise includes analysis of process technologies regarding the performance and both capital and operating cost. Based on the above analysis the SBR system is proposed;</li> <li>○ This system has been widely used for municipal and industrial wastewater treatment applications to meet specific discharge requirements;</li> </ul>
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Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
	<ul style="list-style-type: none"> <li>○ SBR technology advantages/benefits:               <ul style="list-style-type: none"> <li>● Consistent, high-quality, low nutrient level effluent;</li> <li>● Tolerates wide swings inflow and organic loading;</li> <li>● No clarifier required;</li> <li>● Better control over filamentous growth and settling problems;</li> <li>● Nutrient removal without chemicals – nitrification and de-nitrification, phosphate removal; and</li> <li>● The system can also work with sewage inflow of 20 to 30 per cent of designed capacity due to the presence of variable frequency drive (VFD).</li> </ul> </li> <li>○ SBR system is filled and draws an activated sludge system; and</li> <li>○ SBR process uses high-efficiency oxygen transfer aeration to satisfy the high-rate oxygen consumption requirement at the beginning of the “fill” and “aeration” cycles. SBR is efficient in carbonaceous pollutant removal and amenable to the modification to satisfy nutrient removal of nitrogen (N) and phosphorus (P). Because the fill, aeration, settlement, and draws take place in the same reaction tank, SBR tank itself would serve as the clarifier.</li> </ul>
U. Sanitation (common and public restrooms)	<ul style="list-style-type: none"> <li>○ Common and public restrooms are provided at strategic locations, apart from restrooms to be built by the TAF developers, and occupant units of IRC-CoE&amp;IDC.</li> </ul>
V. SWM	<ul style="list-style-type: none"> <li>○ SWM is one of the essential services for maintaining the quality of life in SE-TP including IRC-CoE&amp;IDC and for ensuring better standards of health and sanitation;</li> <li>○ If properly collected at source, SWM would reduce the number of downstream problems related to transportation and disposal of the same. The solid waste generated in SE-TP, including IRC-CoE&amp;IDC, can be broadly categorised as under:               <ul style="list-style-type: none"> <li>● Non-hazardous waste;</li> <li>● Hazardous waste;</li> <li>● Domestic wastes: kitchen and wood waste, plastic, paper, floor sweepings;</li> <li>● Road sweeping and sanitary waste: human waste;</li> <li>● Garden and agriculture waste: leaves, branches, plants;</li> <li>● Roads/building construction waste: earth, asphalt, concrete, brick, plaster, wood, glass, stones;</li> <li>● E-Waste: computer systems, peripheral equipment, mobile phone sets, TVs, audio sets and also household appliances; and</li> <li>● Hospital and bio-medical waste.</li> </ul> </li> <li>○ <b>Exhibit No. 12.3</b> depicts the role of integrated SWM is to reduce the quantity of solid waste disposed of to land by recovering materials and energy from solid waste.</li> </ul>

Exhibit No. 12.3: Waste reduction by integrated SWM



Source: MACE analysis

- The project shall reduce landfill caused by waste so that it is minimal. Source segregation of solid waste generated is a prerequisite for recycling. The gardening in the project can effectively utilise composted organic waste. Also, considerations include energy creation through waste;
- The generation rates of solid waste from different areas vary to such an extent that exact quantification of solid waste generation is not feasible;
- However, an attempt has been made to quantify the solid waste generated from various zones of SE-TP, including IRC-CoE&IDC:
  - Public amenities and utilities – 100 gm/per person/day;
  - Amusement park – 100 gm/per person/day;
  - Resorts/Villas/Cottages- 400 gm/ person/day;
  - Road – 10.12 kg/hectare/day considered for street sweeping;
  - Greenery – 30 kg/hectare/day;
  - Admin – 100 gm/per person/day; and
  - Institutional- 0.2 kg/capita/day.
- It is mandatory to implement source, and the activity includes adequate considerations for the planning of collection, transportation of waste within the site area. Users will be required to segregate their waste into the following categories and put in colour-coded bins:
  - Non-hazardous waste;
  - Hazardous waste;
  - Bio-degradable waste;
  - Non-biodegradable waste;
  - e-waste like parts of computer, floppies, monitor, cartridges, ribbons;
  - Construction debris, street sweepings; and
  - Hospital and biomedical waste.
- From the above, the solid waste treatment facility contemplates treating only bio-degradable waste;



Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
	<ul style="list-style-type: none"> <li>○ The rate of solid waste generation in the initial stages will be less than the estimated quantity, and hence during the initial stage, the solid waste generation rate can be considered as 50% of the estimated quantity;</li> <li>○ The entire solid waste is planned to be collected and treated in the municipal solid waste composting plant within SE-TP including IRC-CoE&amp;IDC, and the occupant units waste (both hazardous and non-hazardous) shall be disposed to a suitable landfill outside the SE-TP including IRC-CoE&amp;IDC; and</li> <li>○ Earmarking suitable area for development of composting plant within SE-TP including IRC-CoE&amp;IDC to handle the solid waste generated;</li> </ul>
W. Power supply and distribution	<ul style="list-style-type: none"> <li>○ Provision of at least 10% of the energy used in the project from renewable sources with a long-term strategy to increase the percentage of renewable energy sources;</li> <li>○ Electricity shall be available 24x7 in all parts of the site with smart metering linked to online platforms for monitoring and transparency;</li> <li>○ The system parameters are as follows: <ul style="list-style-type: none"> <li>● Transmission line – 33/11 kV;</li> <li>● Number of phases – 3;</li> <li>● System frequency – 50 Hz; and</li> <li>● Consumer supply voltage 33 kV / 11 kV/415/240 Volt.</li> </ul> </li> <li>○ As peak demand may vary from each facility in SE-TP including IRC-CoE&amp;IDC, a diversity factor, which relates peak demand to rated load demand or calculated demand, is utilised in the computation of maximum demand;</li> <li>○ The applicable diversity factor is 50 – 80%;</li> <li>○ Power losses occur in the distribution network depending upon the type of conductors and equipment installed. As this is a complete loss of the system, the proposal envisages keeping this loss below 10% of the total load;</li> <li>○ The proposal includes distribution substation in a strategic location, and individual facilitation and all power reticulation are to be carried out at 11 kV;</li> <li>○ The advantage with reticulation at 11 kV is that it is the standard voltage and therefore electrical reticulation equipment for 11 kV systems would be readily available including spares;</li> <li>○ The distribution network is the main backbone of the reticulation system. It is essential that the network must deliver uninterrupted power, in the right quantity and quality to individual facilities continuously;</li> <li>○ A network of overhead lines or underground cables can distribute power;</li> <li>○ For the initial phase, the considerations include an overhead distribution system, and however, the underground cable system shall replace the overhead distribution system over a period: <ul style="list-style-type: none"> <li>● Lighting controls – All non-emergency exterior and common area lighting such as landscaping, surface and covered parking, pathways, bicycle lanes, street lighting shall have daylight sensor/ timer-based control.'</li> <li>● Pumps and motors – with the efficiency of 85% and duty greater than 3.5 HP; and</li> <li>● Centralised HVAC systems.</li> </ul> </li> <li>○ Onsite renewable energy: <ul style="list-style-type: none"> <li>● Use of on-site renewable technologies, to minimise environmental impacts associated with the use of fossil fuel energy; and</li> </ul> </li> </ul>

Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
	<ul style="list-style-type: none"> <li>● Rooftop solar PV panels are one of the proven methods of renewable energy. It has been envisaged to provide such solar PV panels for generating power leveraging the roof spaces available atop the various building.</li> <li>○ Energy metering: <ul style="list-style-type: none"> <li>● Sub-metering to improve energy performance, and thereby save energy;</li> <li>● Water pumping;</li> <li>● Groundwater pumping;</li> <li>● Treated wastewater pumping;</li> <li>● Exterior area lighting, including landscapes;</li> <li>● Centralised HVAC systems;</li> <li>● Renewable energy generation; and</li> <li>● Power backup systems.</li> </ul> </li> <li>○ Building-level energy consumption.</li> </ul>
X. Street lighting, outdoor light pollution reduction	<ul style="list-style-type: none"> <li>○ From the environmental consideration, it is planned to follow the strategy not to disturb the existing bio-diversities of the Island;</li> <li>○ Light pollution is one of the major threats to the female turtle and hatching;</li> <li>○ Artificial lights may disrupt hatching;</li> <li>○ As a mitigation measure, it is proposed that usage of high-intensity lights is prohibited along the coastal area of SE-TP;</li> <li>○ The proposal envisages two different forms of street light: <ul style="list-style-type: none"> <li>● Street lights for the road network; and</li> <li>● Solar street lighting.</li> </ul> </li> <li>○ All the road and streets are provided with street lighting not only to assist pedestrians and traffic but also to increase safety and security in the area;</li> <li>○ All lighting includes Light Emitting Diode (LED) street light fixtures mounted on power poles or street light columns;</li> <li>○ In the scheme of illumination, lighting has been conceived in 3 different forms. <ul style="list-style-type: none"> <li>○ Street lights for the roads/ driveways</li> <li>○ Decorative post-top-lanterns for the pathways</li> <li>○ High mast from towers for open areas</li> </ul> </li> <li>○ The internal road within the zone and the connecting roads of all zones are provided with street lighting not only to assist pedestrians and traffic but also to increase safety and security in the area. It is recommended that all lighting should be LED light fixtures mounted on street light poles;</li> <li>○ Average illumination should be about 20 lux.</li> <li>○ The decorative post top lantern should be provided to illuminate the walkways in the park. The post top lantern shall be LED light fixtures.</li> <li>○ High mast lights shall be of 30 m height with 8x250 Watt LED flood light fixtures.</li> <li>○ For major roads, the average illumination should be about 20 lux;</li> <li>○ Tourism eco-friendly lights, musical fountain lightings, tourist guiding eco-friendly lightings etc. shall be provided; and</li> <li>○ Exterior lighting shall be in such a manner that no external light fixture emits more than 5% of the total initial designed fixture.</li> </ul>
Y. IT connectivity, telecommunica	<ul style="list-style-type: none"> <li>○ The project shall have Wi-Fi services with high-speed Internet across SE-TP including IRC-CoE&amp;IDC area;</li> </ul>

Components	Detailing of utilities, infrastructure within proposed SE-TP including IRC-CoE&IDC
tion, and ICT-enabled occupant unit services	<ul style="list-style-type: none"> <li>o The concerned officials of the ministry and other private operators shall provide all telecommunication services;</li> <li>o The infrastructure includes value-added telecom services and internal communications for the users are not covered under the general infrastructure;</li> <li>o Provision of all major services through online and offline platforms;</li> <li>o The occupant units can access information through data available on the online system; and</li> <li>o Robust data infrastructure system shares information and enhances internal coordination.</li> </ul>
Z. Landscaping, public open spaces and green cover or vegetation	<ul style="list-style-type: none"> <li>o The activity includes works associated with the landscaping within the IRC-CoE&amp;IDC covering tree strips along the boundary, roads, public greenery;</li> <li>o Well, dispersion of public open spaces throughout the site;</li> <li>o The workspace shall have access to open space within 10 minutes walking distance;</li> <li>o Open spaces are of various types – natural, green, plazas, parks, or recreation areas – which serve various sections of people;</li> <li>o The green cover shall have a minimum of ten natives/adaptive trees per acreage or plant tree saplings that can mature into fully grown-up trees with large canopy in the next five years; and</li> <li>o The use of turf is limited to conserve water. Further, planting the landscape area with drought-tolerant/ native/ adaptive species (excluding turf species).</li> </ul>
AA. Management of irrigation systems	<ul style="list-style-type: none"> <li>o 50% of landscape planting beds shall have a drip irrigation system to reduce evaporation;</li> <li>o 75% of the turf area shall have a sprinkler irrigation system to reduce water loss;</li> <li>o Installation of the time-based controller for the valves to minimise the evaporation loss and for ensuring the plant health; and</li> <li>o Pressure-regulating device(s) are installed to maintain optimum pressure to prevent water loss.</li> </ul>
BB. Safety and security	<ul style="list-style-type: none"> <li>o The site to have very high levels of public safety – all tourist and occupancy units to feel safe in all parts of the site during all hours of the day; and</li> <li>o The proposal includes a lighting system and CCTV surveillance system.</li> </ul>
CC. Specialised tourism infrastructure	<ul style="list-style-type: none"> <li>o It is also envisaged to provide the specialised infrastructure within SE-TP, including IRC-CoE&amp;IDC catering to the specific requirements of the occupant units including: <ul style="list-style-type: none"> <li>• CoE and IDC- hub (as a part of IRC);</li> <li>• Skill development; and</li> <li>• Other facilities.</li> </ul> </li> </ul>
DD. Air quality and biodiversity conservation	<ul style="list-style-type: none"> <li>o The project shall have clean air by international standards;</li> <li>o Live air quality monitoring shall cover the entire area, and the activity includes mapping of the data of air quality through the smart environment monitoring system; and</li> <li>o Indicators and monitoring mechanism to conserve and protect biodiversity.</li> </ul>

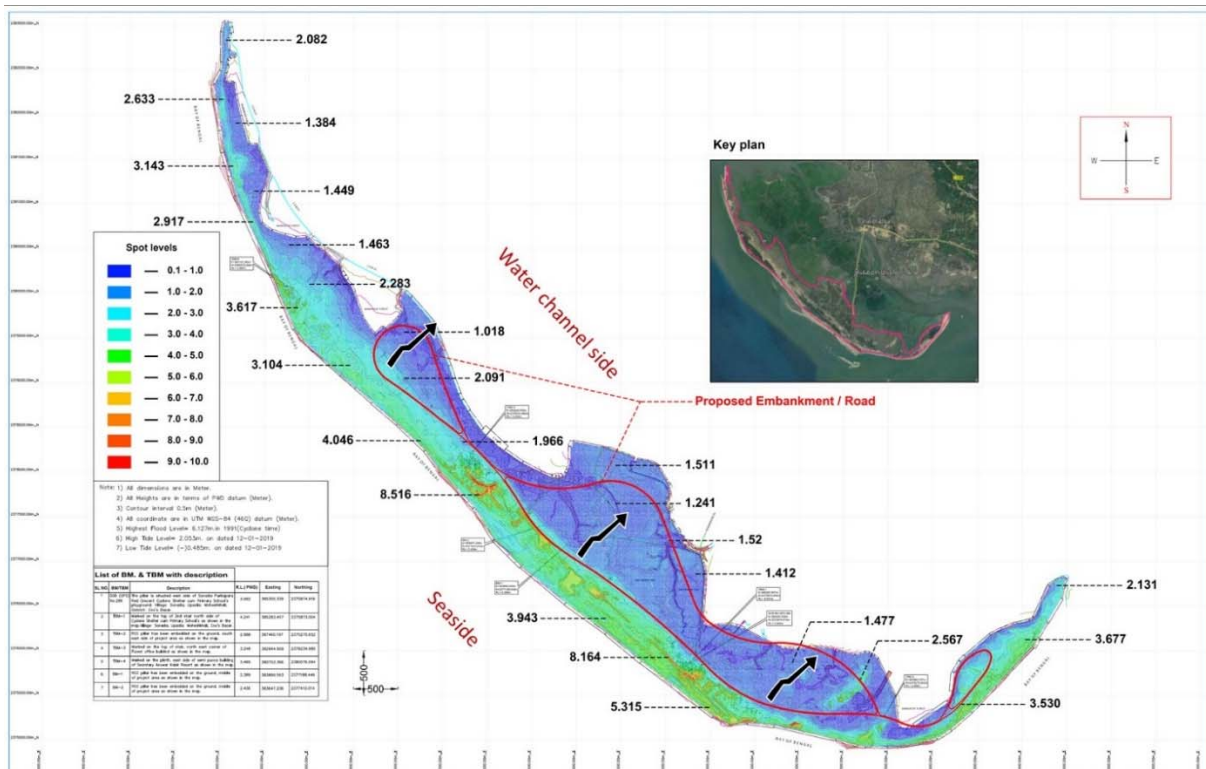
*Source: MACE analysis*

## 12.4. SE-TP infrastructure assessment and estimation

### A. Site grading and development

- The average natural ground level for the proposed development area varies between +1 to +2 m;
- To avoid inundation due to intrusion of water from the adjacent sea and water channel, an embankment cum road has been proposed all along the periphery of the proposed development area;
- It is observed that the proposed development area is almost flat and is slightly elevated on the seaside and sloping towards the existing water channel on the Eastern side;
- Hence, the proposed embankment level is high on the water channel side and low on the Seaside;
- The proposed height of the embankment on the seaside is +4.5 m above MSL and +6.00 m above MSL on the side of the water channel;
- These proposed levels are based on consideration of historical Maximum Flood Level data (for 50 years) and with the view of not restricting the beautiful sea view and sea breeze for the tourists;
- An average depth of 0.4 m filling above the existing natural ground level is considered, and the total estimated quantity of site filling is 437057 cum;
- The site can be filled with the dredged soil from Maheshkhali water channel; and
- However, the detailed hydrographic study has to be carried out for identifying the suitable stretches for dredging.

Exhibit No. 12.4: Contours within the proposed planning area



Source: MACE analysis

## B. Roads – driveway

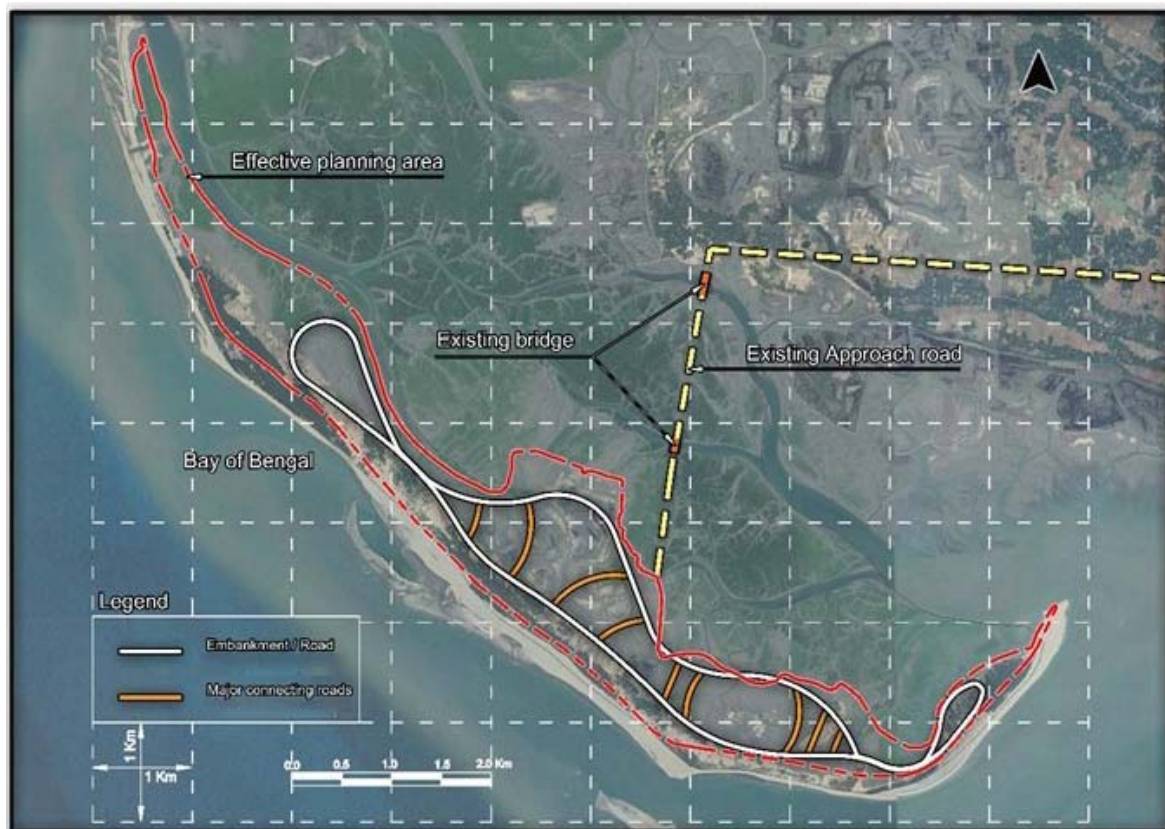
- Primary driveway networks are planned to give access to the development components within SE-TP;
- These are exclusively proposed to facilitate the internal movement of tourists and occupant units to access various components within the SE-TP via NMT modes such as battery car, bicycle and walking;
- The network is looped and well-integrated with all the proposed components and facilities within SE-TP;
- The details of NMT driveways planned within the SE-TP are provided in [Table No. 12.8](#).

Table No. 12.8: Details of NMT corridors within the SE-TP

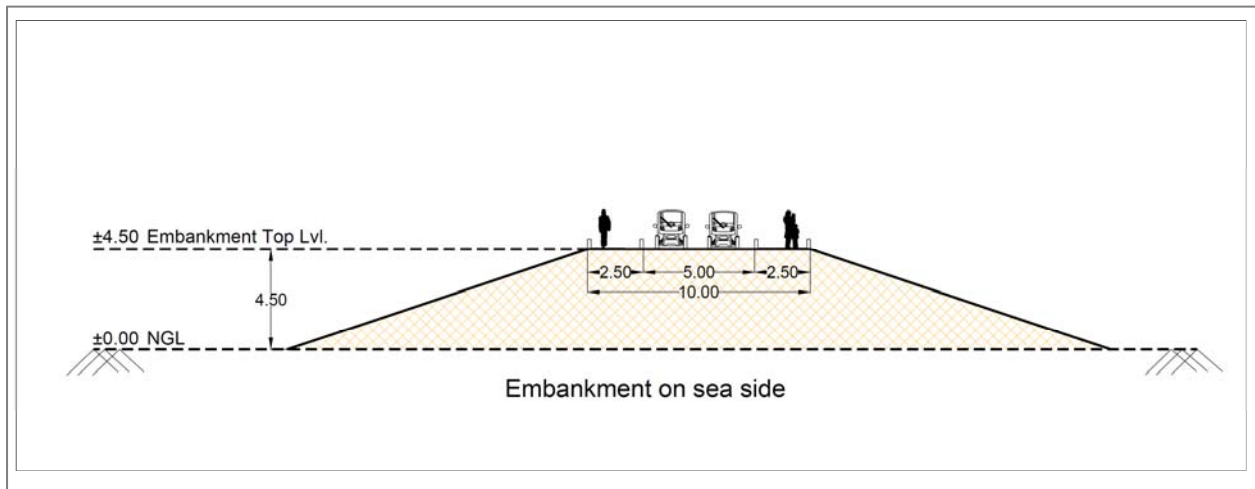
Category	RoW width (m)	Length (km)
Embankment cum road	7.5	17.9
Road connecting zones	7.5	4.6
<b>Total</b>		<b>22.5</b>

*Source: MACE analysis*

Exhibit No. 12.5: Road network layout



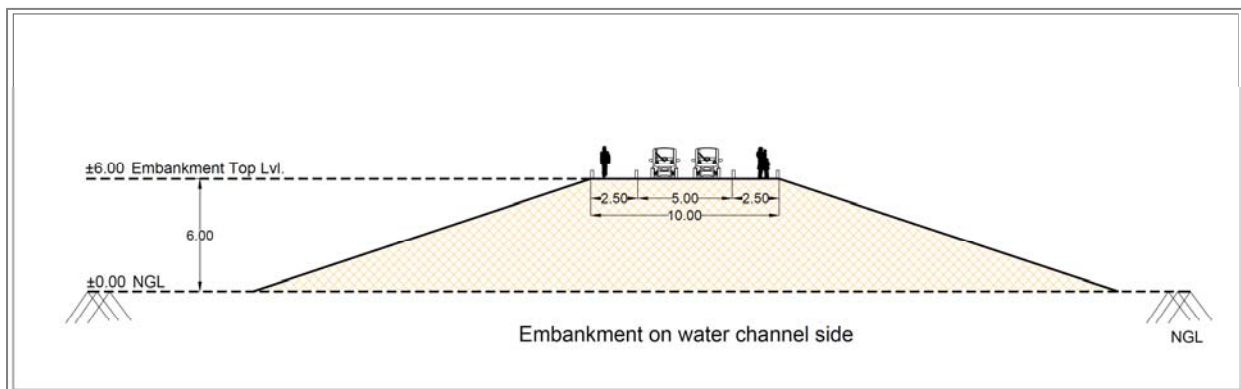
*Source: MACE analysis*



*Source: MACE analysis*

Exhibit below outlines the cross-sectional view of the driveway structure cum embankment on water channel side.

Exhibit No. 12.7: Cross-sectional view of road structure on water channel



*Source: MACE analysis*

### C. Fire protection demand - non-potable

- o Fire demand in litres per minute has been calculated based on the following formula:

$$Q_{FD} = 4000 \times (P)^{0.5} \times (1 - 0.01 \times (P)^{0.5})$$

Where,

P = Population in thousands per ha

$Q_{FD}$  = 825.13 lpm

= 49.50 cum/hr

- o Considering two hours of fire demand requirement, the total quantity of water required for fire protection is 99 cum.
- o The consideration for the demand for firefighting include daily demand as onetime storage of 99 cum, i.e. 2 hours of fire demand will be created and maintained

### D. Average water demand

- o **Table No. 12.9** presents the total average water demand based on computation and analysis.

Table No. 12.9: Estimated water demand – zone wise

Sl. No.	Types of zones	Potable demand (cum/day)	Non-potable demand (cum/day)	Total water demand (cum/day)	Fire Demand (Cum)
1	Entrance zone	3.63	926.92	930.55	4.12
2	Heritage and hospitality zone	119.32	141.71	261.03	25.94
3	Knowledge centre zone	13.81	62.82	76.63	10.92
4	Family entertainment zone	40.93	12.14	53.07	23.67
5	Adventure zone	1355.95	22.66	1378.61	18.77
6	Eco-science zone	251.09	127.90	378.99	15.60
7	Public amenity	254.83	131.27	386.10	
	<b>Total</b>	<b>2039.55</b>	<b>1425.42</b>	<b>3464.97</b>	<b>99.02</b>
	<b>Total in Millions of Litres Per Day (MLD)</b>	<b>2.04</b>	<b>1.43</b>	<b>3.46</b>	<b>0.10</b>

Source: MACE analysis

- o Table No. 12.10 depicts the estimated water demand for the proposed SE-TP, including IRC-CoE&IDC.

Table No. 12.10: Estimation of average daily water demand

Sl. No	Types of zones	Sea water demand (cum/day)	Potable demand (cum/day)	Non-potable demand (cum/day)	Total water demand (cum/day)
1	<b>Entrance zone</b>		3.63	5.82	9.45
	Entrance zone makeup water			921.1	921.1
2	<b>Heritage and hospitality zone</b>				
	a Pavilion		5.214	4.266	9.48
	b Arts & craft village		13.61	12.60	26.21
	c Star hotel		15.68	10.08	25.76
	d Business & relaxation		84.81	65.27	150.08
	e Makeup water			49.50	49.50
3	<b>Knowledge centre zone</b>				
	a IRC-CoE&IDC		5.45	5.47	10.91
	b Golf course		8.36	57.36	65.72
4	<b>Family entertainment zone</b>				
	a Botanical Garden		38.58	8.94	47.52
	b Villas		2.35	1.21	3.56
	c Open garden			1.99	1.99
5	<b>Adventure zone</b>		27.70	22.66	50.36
	Adventure zone makeup water for wet rides		1328.25		1328.25
6	<b>Eco-science zone</b>				
	a Oceanarium		42.02	34.38	76.40
	b Eco-science zone makeup water for water pool			86.13	86.13
	c Eco-science zone makeup water for oceanarium	1563.56	200.13		200.13

d	Eco-tents		8.94	7.39	16.33
7	Public amenity		254.83	131.27	386.10
	<b>Total</b>	<b>1563.56</b>	<b>2039.55</b>	<b>1425.42</b>	<b>3464.97</b>

**Source:** MACE analysis

- o Apart from the calculated water demand on a regular basis, there are certain components which possess one-time water requirement and the demand for the same is provided in Table No. 12.11.

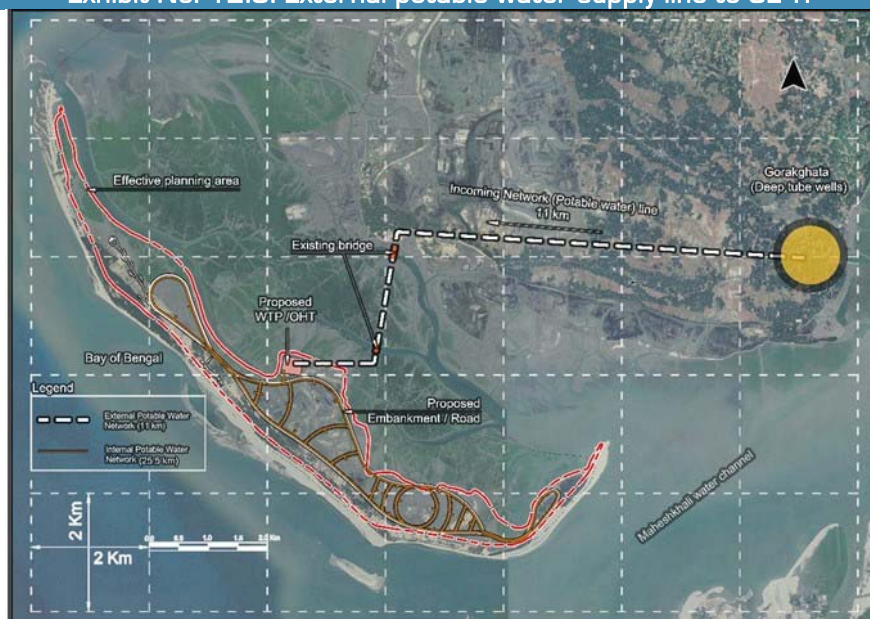
**Table No. 12.11: Water demand for one-time water requirement**

Zone	Component	One-time water requirement (cum)	
Adventure zone	Wet rides	4025	
Zone	Component	One-time water requirement - seawater (cum)	One-time water requirement - freshwater (cum)
Eco-science zone	<b>Oceanarium</b>		
	Main pavilion tank	10000	0
	Leisure pool with 1 m depth	0	850
	Aquarium - 80 numbers	120	0
	Aquarium - 80 numbers	0	120
	Small thematic pavilion with 1 m depth	343.75	687.5
	<b>Total</b>	<b>10463.75</b>	<b>1657.50</b>

**Source:** MACE analysis

- o From the estimated water demand, it is observed that the total water demand is 3.46 MLD out of which 2.04 MLD is potable water requirement, and 1.43 MLD is non-potable water requirement.

**Exhibit No. 12.8: External potable water supply line to SE-TP**



**Source:** MACE analysis



### E. Water storage

- o The proposal includes following infrastructure for the SE-TP including IRC-CoE&IDC
- o **Underground storage tank**
  - **Table No. 12.12** shows the total storage capacity of the underground storage tank based on 24 hours storage requirement.

**Table No. 12.12: Underground sump storage capacity**

S. No.	Description	Quantity	Unit
1	Potable water	2000	Cum
2	Non-potable water including fire demand	1500	Cum

*Source: MACE analysis*

- There will be two underground storage tanks for storing potable and non-potable water including fire demand
- o **ELSR**
  - **Table No. 12.13** shows the total storage capacity of the overhead storage tank based on 2 hours storage requirement.

**Table No. 12.13: Overhead tank storage capacity**

S. No.	Description	Quantity	Unit
1	Potable water	170	Cum
2	Non-potable water including fire demand	130	Cum

*Source: MACE analysis*

- There will be 2 ELSR for storing potable and non-potable water including fire demand
- As per standard norms, the tail end should have a minimum residual pressure of 7 m. The staging height of ELSR shall be fixed accordingly by the project implementation company
- The required pipe size and pump capacity is provided in the following table

**Table No. 12.14: Pipe sizing and length details**

Pipe size diameter (in mm)	Length of pipe (in m)		
	Potable water pipeline	Non-potable water pipeline	Total
110	52582	105165	157747
140	15775		15775
160	15775		15775
200	10516		10516
250	10516		10516
Total	105165	105165	210329

*Source: MACE analysis*

**Table No. 12.15: Pump capacity**

Description	Potable water	Non-potable water	Unit
Capacity	0.047	0.035	cum/sec
Number of pumps	2W+1S	2W+1S	
Power requirement of each pump	12.00	9.00	kW

*Source: MACE analysis*

### F. Sewage generation

- o Table No. 12.15 presents the quantity of wastewater generated in domestic premises based on the general wastewater generation pattern
- o Treated sewage water available @ 90% = 600 cum/day
- o Non-potable water demand = 1425 cum/day

Table No. 12.16: Estimation of sewage and sullage generation

Sl. No.	Types of zones	Potable demand (cum/day)	Non-potable demand (cum/day)	Total water demand (cum/day)	Total sewage quantity (cum/day)
1	Entrance zone	3.63	926.92	930.55	5.77
2	Heritage and hospitality zone	119.32	141.71	261.03	144.42
3	Knowledge centre zone	13.81	62.82	76.63	20.81
4	Family entertainment zone	40.93	12.14	53.07	10.66
5	Adventure zone	1355.95	22.66	1378.61	44.04
6	Eco-science zone	251.09	127.90	378.99	78.14
7	Public amenity	254.83	131.27	386.10	296.01
	<b>Total</b>	2039.55	1425.42	3464.97	599.85
	<b>Total in MLD</b>	<b>2.04</b>	<b>1.43</b>	<b>3.46</b>	<b>0.60</b>

Source: MACE analysis

The total length of the proposed sewer line and the required pipe size details are provided in the following table.

Table No. 12.17: Pipe size- sewerage network

Pipe size in mm	Pipe length in m
150	22371
200	15979
300	12783
400	6392
500	3196
600	1918
700	1278
<b>Total</b>	<b>63917</b>

### G. Sewage treatment plant

- o One (1) number of sewage treatment plant of capacity 0.6 MLD for SE-TP, including IRC-CoE&IDC, is proposed.

Exhibit No. 12.9: Sewerage network layout



Source: MACE analysis

#### H. Solid waste generation

- The total solid waste generation, as shown in Table No. 12.18 for the proposed SE-TP, including IRC-CoE&IDC, is 2.79 tonnes per day (TPD).

Table No. 12.18: Estimation of solid waste generation

S. No.	Component	Basis	Unit	Solid waste generation quantity (kg/day)
1	Sonadia Island tourism facilitation development			
a	Embankment	10.12	kg/ha/day	136
b	Road connecting zones	10.12	kg/ha/day	35
2	Entrance zone			
a	Internal road / path	10.12	kg/ha/day	9
b	E-car and cycle parking			
c	Information kiosk/globe			
d	Helipad			
e	Viewing deck	100	gm/capita/day	40
f	Water pool with musical fountains			
g	Green / landscape	30	kg/ha/day	17
h	Jetty			
3	Heritage and hospitality zone			
a	Pavilion	100	gm/capita/day	20
b	Arts & craft village			
i	Themed pavilion	100	gm/capita/day	50
ii	Internal road / path	10.12	kg/ha/day	3
iii	Green / landscape	30	kg/ha/day	9
c	Star hotel			

<i>i</i>	<i>Building</i>	450	gm/capita/day	108
<i>ii</i>	<i>Internal road / path</i>	10.12	kg/ha/day	4
<i>iii</i>	<i>Green / landscape</i>	30	kg/ha/day	12
d	Business & relaxation			
<i>i</i>	<i>Statue deck</i>	100	kg/ha/day	40
<i>ii</i>	<i>Heritage pavilion</i>	100	gm/capita/day	82.4
<i>iii</i>	<i>Convention centre and MICE</i>	0.2	kg/capita/day	1100
<i>iv</i>	<i>Budget hotel</i>	450	gm/capita/day	90
<i>v</i>	<i>Yoga centre and meditation hall</i>	0.2	kg/capita/day	60
<i>vi</i>	<i>Resorts and multi-cuisine restaurant</i>	400	gm/capita/day	14.4
<i>vii</i>	<i>Water pool</i>			
<i>viii</i>	<i>Green / landscape</i>	30	kg/ha/day	12
<i>ix</i>	<i>Internal road / path</i>	10.12	kg/ha/day	4
4	Knowledge centre zone			
a	IRC-CoE&IDC	0.2	kg/capita/day	40
b	Internal road / path	10.12	kg/ha/day	1
c	Green / landscape	30	kg/ha/day	6
d	Golf course	0.2	kg/capita/day	38
e	Club house	0.2	kg/capita/day	20
f	Kiosk	10.12	kg/ha/day	1
g	Cottages	450	gm/capita/day	18
5	Family entertainment zone			
a	Botanical Garden			
<i>i</i>	<i>Greenhouses and agro-tourism</i>	30	kg/ha/day	62
<i>ii</i>	<i>Butterfly park</i>	30	kg/ha/day	3
<i>iii</i>	<i>Public square</i>	30	kg/ha/day	15
<i>iv</i>	<i>Internal road / path</i>	10.12	kg/ha/day	8
<i>v</i>	<i>Green sculptures and eco-bridge</i>	30	kg/ha/day	3
<i>vi</i>	<i>Green / landscape</i>	30	kg/ha/day	30
<i>vii</i>	<i>Multi-cuisine restaurant</i>	450	gm/capita/day	31.5
b	Villas	450	gm/capita/day	10.8
c	Open garden	30	kg/ha/day	12
6	Adventure zone			
a	Dry rides and other adventure activity	100	gm/capita/day	152.6
b	Wet rides and other adventure activity	100	gm/capita/day	152.6
7	Eco-science zone			
a	Oceanarium	100	gm/capita/day	160
b	Marine biology research centre	0.2	kg/capita/day	6
c	Internal road / path	10.12	kg/ha/day	2
d	Wooden deck	100	kg/ha/day	26
e	Water pool			
f	Amphitheatre	100	gm/capita/day	100
g	Green and organic cultivation	30	kg/ha/day	9
h	Wooden walkway	10.12	kg/ha/day	4
i	Eco-tents	400	gm/capita/day	27.6
j	Sky bridge	30	kg/ha/day	2
k	Green / landscape	30	kg/ha/day	4
	Total solid waste quantity estimation (kg/day)			<b>2790</b>
	Total in TPD			<b>2.79</b>

Source: MACE analysis

With the aim of preserving the nature of the Island, it is planned, not to propose the solid waste dumping, handling and treatment system within the Island. It is suggested to have an efficient collection system within the park and is recommended to transport the generated solid waste to the proposed solid waste dumping yard by the Cox's Bazar development authority which falls within Maheshkhali Paurashava area.

## I. Power demand

### ➔ Construction phase

- The provision of two numbers batching plant, four number bore wells and power requirement for welding and other electrical tools during the construction phase of the project, leads to the power requirement of about 660 KW. The required power demand works out to around 500 kilo Volts Ampere (kVA) including lighting, considering diversity. Temporary arrangements from the nearest available power source should suffice during the construction phase. Alternatively, by deploying an adequate number of portable/truck-mounted/trailer mounted 415 volts diesel generator (DG) sets of 160 kVA capacities, the construction power requirements are manageable.

### ➔ Operational and functional phase

- The total estimated demand for proposed SE-TP, including IRC-CoE&IDC, is 6.31 mVA. **Table No. 12.17** provides the plot-wise breakup of the power demand.

Table No. 12.19: Estimation of power demand

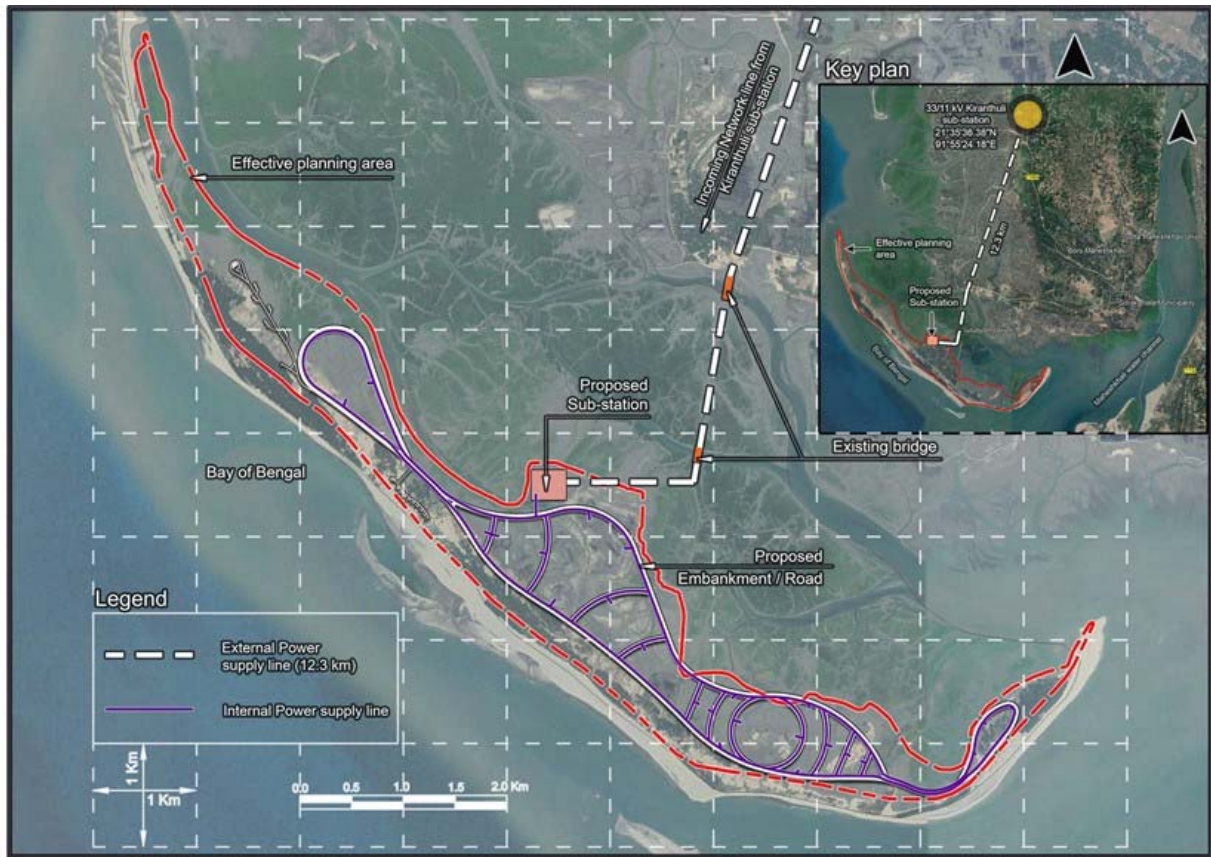
S. No.	Component	Area in Acre	Total Built-up area	Load in kVA/Acre	kVA/Sq.m of BUA	Simultaneity Factor	Loss Factor	Load in kVA
<b>1</b>	<b>Sonadia Island tourism facilitation development</b>							
a	Connecting road	8.66		2.00		100%	1.10	19
b	Embankment	33.25		2.00		100%	1.10	73
<b>2</b>	<b>Entrance zone</b>							
a	Internal road / path	2.20		2.00		100%	1.10	5
b	E-car and cycle parking	0.17		14.00		100%	1.10	3
c	Information kiosk/globe	0.10		14.00		80%	1.10	1
d	Helipad	0.49		100.00		80%	1.10	43
e	Viewing deck	0.28		14.00		80%	1.10	3
f	Water pool with musical fountains	3.45		14.00		60%	1.10	32
g	Green / landscape	1.41		14.00		50%	1.10	11
h	Jetty	0.26		50.00		80%	1.10	12
<b>3</b>	<b>Heritage and hospitality zone</b>							
<b>a</b>	<b>Pavilion</b>							
		4.70		14.00		50%	1.10	36
<b>b</b>	<b>Arts &amp; craft village</b>							
i	Themed pavilion	0.49	2000		0.14	60%	1.10	189
ii	Internal road / path	0.65		2.00		100%	1.10	1
iii	Green / landscape	0.73		14.00		50%	1.10	6
<b>c</b>	<b>Star hotel</b>							

i	Building	0.49	8000		0.14	80%	1.10	1,010
ii	Internal road / path	0.99		2.00		100%	1.10	2
iii	Green / landscape	0.99		14.00		50%	1.10	8
<b>d</b>	<b>Business &amp; relaxation</b>							
i	Statue deck	0.99		14.00		60%	1.10	9
ii	Heritage pavilion	0.15	600		0.02	60%	1.10	9
iii	Convention centre and MICE	0.49	4000		0.13	70%	1.10	405
iv	Budget hotel	0.30	2400		0.14	70%	1.10	265
v	Yoga centre and meditation hall	0.13	530		0.14	70%	1.10	59
vi	Resorts and multi-cuisine restaurant	0.09	720		0.18	70%	1.10	99
vii	Water pool	0.37		14.00		60%	1.10	3
viii	Green / landscape	0.99		14.00		50%	1.10	8
ix	Internal road / path	1.09		2.00		100%	1.10	2
<b>4</b>	<b>Knowledge centre zone</b>							
a	IRC-CoE&IDC	0.62	2500		0.12	60%	1.10	197
b	Internal road / path	0.26		2.00		100%	1.10	1
c	Green / landscape	0.50		14.00		50%	1.10	4
d	Golf course	35.93		2.00		80%	1.10	63
e	Clubhouse	71.90	800		0.12	70%	1.10	74
f	Kiosk	0.40	294		0.10	80%	1.10	25
g	Cottages	0.10	715		0.10	60%	1.10	45
<b>5</b>	<b>Family entertainment zone</b>							
<b>a</b>	<b>Botanical Garden</b>							
i	Greenhouses and agro-tourism	5.10		50.00		80%	1.10	224
ii	Butterfly park	0.25		14.00		50%	1.10	2
iii	Public Square	1.24		14.00		50%	1.10	10
iv	Internal road / path	1.99		2.00		100%	1.10	4
v	Green sculptures and eco-bridge	0.25		14.00		50%	1.10	2
vi	Green / landscape	2.43		14.00		50%	1.10	19
vii	Multi-cuisine restaurant	0.12	500		0.14	70%	1.10	55
b	Villas	0.10	800		0.18	60%	1.10	95
c	Open garden	0.99		14.00		50%	1.10	8
<b>6</b>	<b>Adventure zone</b>							
a	Dry rides and other adventure activity	89.02		18.00		50%	1.10	881
b	Wet rides and other	81.00		10.00		50%	1.10	445

	adventure activity							
<b>7</b>	<b>Eco-science zone</b>							
a	Oceanarium	4.07	9231		0.18	80%	1.10	1,457
b	Marine biology research centre	0.49	2000		0.18	80%	1.10	316
c	Internal road / path	0.43		2.00		100%	1.10	1
d	Wooden deck	0.64		14.00		80%	1.10	8
e	Water pool	0.62		14.00		60%	1.10	6
f	Amphitheatre	0.25		51.00		80%	1.10	11
g	Green and organic cultivation	0.74		14.00		50%	1.10	6
h	Wooden walkway	0.89		2.00		100%	1.10	2
i	Eco-tents	0.45	575		0.08	60%	1.10	32
j	Sky bridge	0.15		14.00		80%	1.10	2
k	Green / landscape	0.30		14.00		80%	1.10	4
							<b>Total demand in kVA</b>	<b>6,312</b>
							<b>Total demand in mVA</b>	<b>6.31</b>

Source: MACE analysis

Exhibit No. 12.10: Internal power distribution network



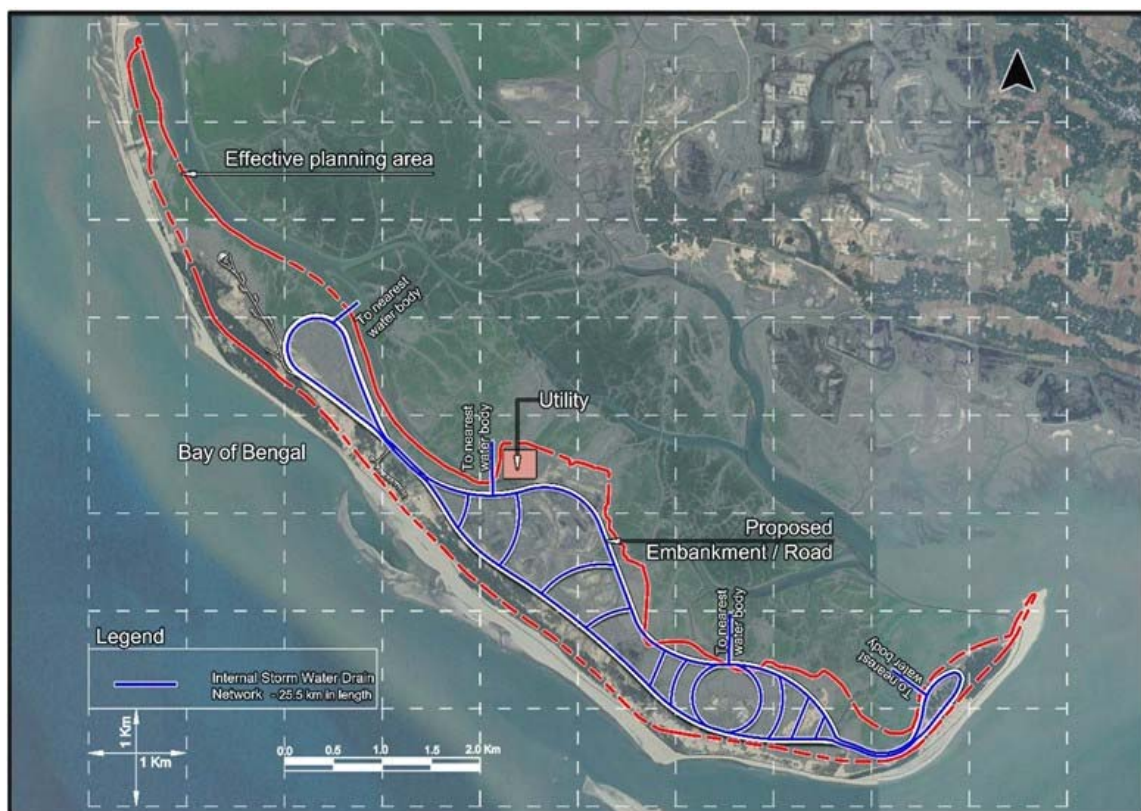
Source: MACE analysis

## J. Drainage

Based on the site gradient, the drainage pattern has been decided. It has been planned to discharge the flow of the internal drain into existing water channels. From the contour it is observed that the site is elevated on the west and is sloping towards Eastern side. Hence, it is planned to propose the drain along the inner edge of the embankment cum road on east side and is planned to discharge into existing water channel.

- The drainage system is planned to cater for the entire eco-tourism park through gravity flow.
- Drains are proposed to be provided on east sides along the entire length of the embankment cum road.
- Open trapezoidal drain is considered for the surface run off collection due to easy maintenance for the primary road. Stone pitching is considered for the side walls and PCC for the base.
- Covered rectangular brick masonry drain is considered for the remaining areas for optimization of area under drainage.
- RCC box / pipe culverts of suitable sizes are considered for road crossings.
- Rainwater harvesting structures are envisaged all along the drain at every 100 m interval.

Exhibit No. 12.11: Internal storm water drain network



Source: MACE analysis



**K. Renewable energy – solar power generation**

- o The total estimated power generation using solar rooftop panels (grid-tied) is 1.165 megawatt (MW). **Table No. 12.18** provides the details of roof areas of various buildings envisaged for solar power generation.

**Table No. 12.20: Estimation of solar power generation***(Area in sq.m)*

S. No.	Component	Ground floor area	Terrace floor area	Solar panel area	No. of buildings	Total rooftop area (sq.m)
1	Themed pavilion	2000	100	1900	1	1900
2	Star hotel	8000	400	7600	1	7600
3	Convention centre and MICE	4000	200	3800	1	3800
4	Budget hotel	2400	120	2280	1	2280
5	Resorts and multi-cuisine restaurant	720	36	684	1	684
6	IRC-CoE&IDC	2500	125	2375	1	125
7	Club house	800	40	760	1	40
8	Kiosk	294	15	279	1	15
9	Cottages	715	36	679	1	36
10	Multi-cuisine restaurant	500	25	475	1	25
11	Villas	800	40	760	1	40
12	Marine biology research centre	2000	100	1900	1	100
<b>Total</b>						<b>16644</b>
Deduct 30% of the area for other structures and equipment (sq.m)						4993
Effective area for solar power generation (sq.m)						11651
Solar power generation (kW)						1165.11
Solar power generation (MW)						1.165

*Source: MACE analysis*

The on-site infrastructure network drawings are provided in **Appendix-Drawings**.

**12.5. Specialised infrastructure in IRC-CoE&IDC**

IRC-CoE&IDC shall be equipped with several modern laboratory and facilities to facilitate CoE core theme research.

The requirements for establishing advanced laboratories (dry and wet) to cater to the needs of hi-tech research are identified based on the findings and positioning of the IRC-CoE&IDC for the greenfield development of the institute as presented in **Table No. 12.19**.

**Table No. 12.21: Specialised research facilities****Common research infrastructure facilities**

- Central instrumentation facility with advanced, sophisticated specialised equipment;
- Recombinant product development facility of good laboratory practice standard - upstream and downstream equipment, quality control and testing equipment;

<ul style="list-style-type: none"> <li>• Photographic facility - facilities for taking photographs of a variety of biological and scientific material including tissue culture, plant and microbial material, all types of electrophoresis gels and autoradiogram;</li> </ul>	
<ul style="list-style-type: none"> <li>• Advanced microscopic facility</li> </ul>	
<ul style="list-style-type: none"> <li>• Plant tissue culture laboratory: Facilities like media room for preparation of culture media equipped with working benches, culture room - controlled temperature, diurnal illumination, and humidity control; racks for placing culture tubes, flasks and shaking machine etc.;</li> </ul>	
<ul style="list-style-type: none"> <li>• Animal cell and tissue culture laboratory: an air-conditioned room, hot room with temperature recorder, microscope room, dark room, sterilisation room and preparation room for media preparation;</li> </ul>	
<ul style="list-style-type: none"> <li>• Animal house: separate compartments for different species and strains of animals with controlled environmental conditions;</li> </ul>	
<ul style="list-style-type: none"> <li>• Experimental botanical garden;</li> </ul>	
<ul style="list-style-type: none"> <li>• Radioactivity laboratory facility;</li> </ul>	
<ul style="list-style-type: none"> <li>• Biosafety level 3 laboratory facility;</li> </ul>	
<ul style="list-style-type: none"> <li>• Biosafety level 2 laboratory facility; and</li> </ul>	
<ul style="list-style-type: none"> <li>• Bioinformatics facilities.</li> </ul>	
<b>Common sophisticated instrumentation facility</b>	
<ul style="list-style-type: none"> <li>• Fourier transform infrared spectroscopy;</li> </ul>	<ul style="list-style-type: none"> <li>• Fluorescent in situ hybridisation microscope;</li> </ul>
<ul style="list-style-type: none"> <li>• Gas chromatograph-mass spectrometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Transmission electron microscope;</li> </ul>
<ul style="list-style-type: none"> <li>• Laser confocal microscope with fluorescence correlation spectroscopy;</li> </ul>	<ul style="list-style-type: none"> <li>• Scanning electron microscope;</li> </ul>
<ul style="list-style-type: none"> <li>• Time-resolved fluorescence spectrometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Real-time laser scanning confocal microscope;</li> </ul>
<ul style="list-style-type: none"> <li>• Wavelength dispersive x-ray fluorescence spectrometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Fully motorised laser total internal reflection fluorescence microscopy;</li> </ul>
<ul style="list-style-type: none"> <li>• Energy dispersive x-ray fluorescence spectrometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Trinocular research microscope;</li> </ul>
<ul style="list-style-type: none"> <li>• X-ray diffraction system;</li> </ul>	<ul style="list-style-type: none"> <li>• Liquid nitrogen plant;</li> </ul>
<ul style="list-style-type: none"> <li>• Nuclear magnetic resonance spectrometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Critical point dryer;</li> </ul>
<ul style="list-style-type: none"> <li>• Inverted phase-contrast microscope;</li> </ul>	<ul style="list-style-type: none"> <li>• Ultracentrifuges; and</li> </ul>
<ul style="list-style-type: none"> <li>• Light microscope;</li> </ul>	<ul style="list-style-type: none"> <li>• High-speed centrifuges.</li> </ul>
<b>Plant and agriculture sciences</b>	
<ul style="list-style-type: none"> <li>• Growth chamber;</li> </ul>	<ul style="list-style-type: none"> <li>• Centrifuge;</li> </ul>
<ul style="list-style-type: none"> <li>• Laminar airflow;</li> </ul>	<ul style="list-style-type: none"> <li>• Plate centrifuge; and</li> </ul>
<ul style="list-style-type: none"> <li>• Autoclave;</li> </ul>	<ul style="list-style-type: none"> <li>• Fluorescence-activated cell sorter.</li> </ul>
<ul style="list-style-type: none"> <li>• Microfuge;</li> </ul>	
<b>Animal science and aquaculture</b>	
<ul style="list-style-type: none"> <li>• Growth chamber;</li> </ul>	<ul style="list-style-type: none"> <li>• Live-cell imaging;</li> </ul>
<ul style="list-style-type: none"> <li>• Laminar airflow;</li> </ul>	<ul style="list-style-type: none"> <li>• Bacterial and mammalian cell bioreactors with Fourier-transform infrared spectroscopy (FTIR) analysis; and</li> </ul>
<ul style="list-style-type: none"> <li>• Autoclave;</li> </ul>	<ul style="list-style-type: none"> <li>• Water jacketed CO<sub>2</sub> incubator.</li> </ul>
<b>Life sciences</b>	
<ul style="list-style-type: none"> <li>• DNA thermal cycler;</li> </ul>	<ul style="list-style-type: none"> <li>• Bioreactors;</li> </ul>
<ul style="list-style-type: none"> <li>• DNA sequencer;</li> </ul>	<ul style="list-style-type: none"> <li>• Laminar airflow;</li> </ul>
<ul style="list-style-type: none"> <li>• Ultraviolet-Visible (UV - VIS) spectrophotometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Hot air oven;</li> </ul>

<ul style="list-style-type: none"> <li>• Polyacrylamide and agarose electrophoresis units;</li> </ul>	<ul style="list-style-type: none"> <li>• Microbiological incubator;</li> </ul>
<ul style="list-style-type: none"> <li>• Real-time polymerase chain reaction;</li> </ul>	<ul style="list-style-type: none"> <li>• Orbital shaker;</li> </ul>
<ul style="list-style-type: none"> <li>• Fluorescence-activated cell sorter;</li> </ul>	<ul style="list-style-type: none"> <li>• Bacterial and mammalian cell bioreactors with FTIR analysis;</li> </ul>
<ul style="list-style-type: none"> <li>• Electroporator;</li> </ul>	<ul style="list-style-type: none"> <li>• Fast protein liquid chromatography;</li> </ul>
<ul style="list-style-type: none"> <li>• Electric cell impedance system;</li> </ul>	<ul style="list-style-type: none"> <li>• High-performance liquid chromatography;</li> </ul>
<ul style="list-style-type: none"> <li>• High-speed microplate shaker;</li> </ul>	<ul style="list-style-type: none"> <li>• Gas chromatography;</li> </ul>
<ul style="list-style-type: none"> <li>• Micro sample incubator;</li> </ul>	<ul style="list-style-type: none"> <li>• Mass spectroscopy;</li> </ul>
<ul style="list-style-type: none"> <li>• Gel documentation system;</li> </ul>	<ul style="list-style-type: none"> <li>• Capillary electrophoresis system;</li> </ul>
<ul style="list-style-type: none"> <li>• DNA micro-array;</li> </ul>	<ul style="list-style-type: none"> <li>• Turbo freeze dryer with liquid nitrogen fed cold stage; and</li> </ul>
<ul style="list-style-type: none"> <li>• Co2 incubator;</li> </ul>	<ul style="list-style-type: none"> <li>• Enzyme-Linked Immunosorbent Assay (ELISA) readers.</li> </ul>
<ul style="list-style-type: none"> <li>• Lyophiliser;</li> </ul>	
<b>Biochemical engineering and industrial biotechnology</b>	
<ul style="list-style-type: none"> <li>• Bio-reactor;</li> </ul>	<ul style="list-style-type: none"> <li>• UV-VIS spectrophotometers;</li> </ul>
<ul style="list-style-type: none"> <li>• High-performance liquid chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Atomic absorption spectrophotometer;</li> </ul>
<ul style="list-style-type: none"> <li>• Fast protein liquid chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Ultracentrifuge; and</li> </ul>
<ul style="list-style-type: none"> <li>• Gas chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Refrigerated centrifuges (low and high speed.</li> </ul>
<ul style="list-style-type: none"> <li>• Ultrafiltration systems;</li> </ul>	
<b>Food science and food technology</b>	
<ul style="list-style-type: none"> <li>• Dynamic mechanical analyser;</li> </ul>	<ul style="list-style-type: none"> <li>• Spectrophotometers;</li> </ul>
<ul style="list-style-type: none"> <li>• Gas chromatogram;</li> </ul>	<ul style="list-style-type: none"> <li>• Refractometers;</li> </ul>
<ul style="list-style-type: none"> <li>• Mass spectroscopy;</li> </ul>	<ul style="list-style-type: none"> <li>• Water activity meter;</li> </ul>
<ul style="list-style-type: none"> <li>• Atomic absorption spectrophotometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Viscometers; and</li> </ul>
<ul style="list-style-type: none"> <li>• Nitrogen analyser;</li> </ul>	<ul style="list-style-type: none"> <li>• High-performance liquid chromatography.</li> </ul>
<ul style="list-style-type: none"> <li>• Colourimeter;</li> </ul>	
<b>General Instrumentation facilities identified for each laboratory</b>	
<ul style="list-style-type: none"> <li>• pH meter;</li> </ul>	<ul style="list-style-type: none"> <li>• Microwave oven;</li> </ul>
<ul style="list-style-type: none"> <li>• Millipore water purification system;</li> </ul>	<ul style="list-style-type: none"> <li>• Homogeniser;</li> </ul>
<ul style="list-style-type: none"> <li>• Deep freezer (-20°C, -80°C);</li> </ul>	<ul style="list-style-type: none"> <li>• Electronic weighing balance;</li> </ul>
<ul style="list-style-type: none"> <li>• Chemical fume hoods;</li> </ul>	<ul style="list-style-type: none"> <li>• Ice maker;</li> </ul>
<ul style="list-style-type: none"> <li>• Water bath with shaker;</li> </ul>	<ul style="list-style-type: none"> <li>• Cyclomixer;</li> </ul>
<ul style="list-style-type: none"> <li>• Magnetic stirrer with heater;</li> </ul>	<ul style="list-style-type: none"> <li>• Vacuum pump; and</li> </ul>
<ul style="list-style-type: none"> <li>• Vacuum pump;</li> </ul>	<ul style="list-style-type: none"> <li>• Refrigerated incubator shakers.</li> </ul>
<b>Environmental sciences and bio-diversity</b>	
<ul style="list-style-type: none"> <li>• High-performance liquid chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Chemical oxygen demand analyser;</li> </ul>
<ul style="list-style-type: none"> <li>• Gas chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Fluorimeter;</li> </ul>
<ul style="list-style-type: none"> <li>• Mass spectroscopy;</li> </ul>	<ul style="list-style-type: none"> <li>• Bioreactors; and</li> </ul>
<ul style="list-style-type: none"> <li>• Total organic carbon analyser;</li> </ul>	<ul style="list-style-type: none"> <li>• Atomic absorption spectroscopy.</li> </ul>
<ul style="list-style-type: none"> <li>• Biochemical oxygen demand incubator;</li> </ul>	
<b>Bioinformatics</b>	
<ul style="list-style-type: none"> <li>• High-end computing facility enabling the following applications:</li> </ul>	<ul style="list-style-type: none"> <li>• Insilico proteome analysis;</li> </ul>
<ul style="list-style-type: none"> <li>• Genome-wide association studies;</li> </ul>	

<ul style="list-style-type: none"> <li>• Microarray analysis;</li> </ul>	<ul style="list-style-type: none"> <li>• Molecular modelling, dynamics and simulation; and</li> </ul>
<ul style="list-style-type: none"> <li>• Sequence analysis suites;</li> </ul>	<ul style="list-style-type: none"> <li>• Cheminformatics and drug design.</li> </ul>
<b>Drug discovery and development</b>	
<ul style="list-style-type: none"> <li>• DNA sequencer;</li> </ul>	<ul style="list-style-type: none"> <li>• Fluorenylmethoxycarbonyl solid-phase peptide synthesis;</li> </ul>
<ul style="list-style-type: none"> <li>• Ion trap;</li> </ul>	<ul style="list-style-type: none"> <li>• Suspension multiarray electrochemiluminescence system;</li> </ul>
<ul style="list-style-type: none"> <li>• Matrix-assisted laser desorption/ionization-time of flight and quadrupole time-of-flight mass spectrometry;</li> </ul>	<ul style="list-style-type: none"> <li>• ELISA;</li> </ul>
<ul style="list-style-type: none"> <li>• High-performance liquid chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Haematology analyser; and</li> </ul>
<ul style="list-style-type: none"> <li>• Capillary liquid chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical chemistry analyser.</li> </ul>
<b>Biomedical and health science engineering</b>	
<ul style="list-style-type: none"> <li>• DNA thermal cycler;</li> </ul>	<ul style="list-style-type: none"> <li>• High-performance liquid chromatography;</li> </ul>
<ul style="list-style-type: none"> <li>• DNA sequencer;</li> </ul>	<ul style="list-style-type: none"> <li>• Gas chromatography;</li> </ul>
<ul style="list-style-type: none"> <li>• UV – VIS spectrophotometer;</li> </ul>	<ul style="list-style-type: none"> <li>• Mass spectroscopy;</li> </ul>
<ul style="list-style-type: none"> <li>• Gas chromatography-mass spectroscopy;</li> </ul>	<ul style="list-style-type: none"> <li>• Capillary electrophoresis system;</li> </ul>
<ul style="list-style-type: none"> <li>• Polyacrylamide and agarose electrophoresis units;</li> </ul>	<ul style="list-style-type: none"> <li>• General ultrasound system;</li> </ul>
<ul style="list-style-type: none"> <li>• ELISA readers;</li> </ul>	<ul style="list-style-type: none"> <li>• Magnetic resonance system;</li> </ul>
<ul style="list-style-type: none"> <li>• Gel documentation system;</li> </ul>	<ul style="list-style-type: none"> <li>• Eco-cardiogram;</li> </ul>
<ul style="list-style-type: none"> <li>• DNA micro-array;</li> </ul>	<ul style="list-style-type: none"> <li>• Mass spectrometer with tissue imaging capabilities;</li> </ul>
<ul style="list-style-type: none"> <li>• FTIR analysis;</li> </ul>	<ul style="list-style-type: none"> <li>• Turbidimetry for endotoxin testing; and</li> </ul>
<ul style="list-style-type: none"> <li>• Fast protein liquid chromatography;</li> </ul>	<ul style="list-style-type: none"> <li>• Ion chromatography.</li> </ul>
<b>Specialised infrastructure for consulting and allied activities</b>	
<ul style="list-style-type: none"> <li>• IRC-CoE&amp;IDC shall be equipped with several modern networking and data laboratories and facilities to facilitate learning and development of consulting, consulting support services and training facilities;</li> </ul>	
<ul style="list-style-type: none"> <li>• This is essential considering the need for closer academic research and industry partnership for effective transfer of methodologies and commercialisation of base and advanced level consulting services;</li> </ul>	
<ul style="list-style-type: none"> <li>• The requirements for establishing advanced laboratories to cater to the needs of hi-tech research, intelligence and technical analysis shall be identified based on the market, and user industries need;</li> </ul>	
<ul style="list-style-type: none"> <li>• Further, the specialised infrastructure facilities pertaining to each IRC-CoE shall be finalised based on firming up of the marketing plan and interaction with potential occupant units;</li> </ul>	
<ul style="list-style-type: none"> <li>• The IRC-CoE&amp;IDC will provide for all major databases, knowledge networks and information portals so as to provide access to already developed and research data and thereby allow greater time to build insights, intelligence and appropriate strategies for decision making;</li> </ul>	
<ul style="list-style-type: none"> <li>• The knowledge pools need to be available in multi-locations computer laboratories located across the campus;</li> </ul>	
<ul style="list-style-type: none"> <li>• These laboratories will be a mix of specialised pools while others will provide multi-platform pools;</li> </ul>	
<ul style="list-style-type: none"> <li>• Also, various research and analysis, business intelligence tools are required to be provided and forecasting tools so as to provide data / information / knowledge in capsule format;</li> </ul>	
<ul style="list-style-type: none"> <li>• Availability of the specialised infrastructure would thereby allow candidates to spend maximum time in analysis, deliberation, conducting workshops and primary interactions so as to further</li> </ul>	

validate the available insights and thereby cover the last mile of effective and informed confident decision making;

- Specialised infrastructure would also include access to a large pool of technical and subject matter experts and key opinion leaders across sectors and functional practices with their detailed profiles accessible on the knowledge network. This network would be available to conduct and deliver projects within consulting and support services on an ongoing basis;
- There is a need for a well-equipped learning centre and library with access to all the latest consulting and other sector books, publications and knowledge material with appropriate reading and issuing rights for candidates; and
- The IRC-CoE&IDC will have the infrastructure to support video conferencing facilities to work within physical, geographical and distances limitations and absence of face to face meetings.

*Source: MACE analysis*

## Chapter - 13

# SE-TP off-site infrastructure and linkages

### 13.1. Purpose and objective of off-site infrastructure

For the sustained operation of SE-TP, including IRC-CoE&IDC, it is pertinent that off-site infrastructure and its connectivity to the proposed SE-TP are adequately addressed. To facilitate the integration of basic infrastructure facilities and utilities like water, power and approach road for SE-TP, the existing infrastructure facilities in the vicinity of the site needs to be identified, and gaps that could hinder the development of the SE-TP needs to be addressed. The major off-site infrastructure components considered for SE-TP are as follows:

Access road to SE-TP

Power supply to SE-TP

Water supply to SE-TP

*Source: MACE analysis*

The above-mentioned off-site infrastructure components would be developed by third-party government agencies and monitored by BEZA.

#### 13.1.1. Approach road

An existing approach road of width varying between 2.75 to 3 m connects the site with Zila road (Z1004) at a distance of 11.5 km from the site, as shown in **Exhibit No. 13.1** and **13.2**.

Exhibit No. 13.1: Approach road connecting the planning area

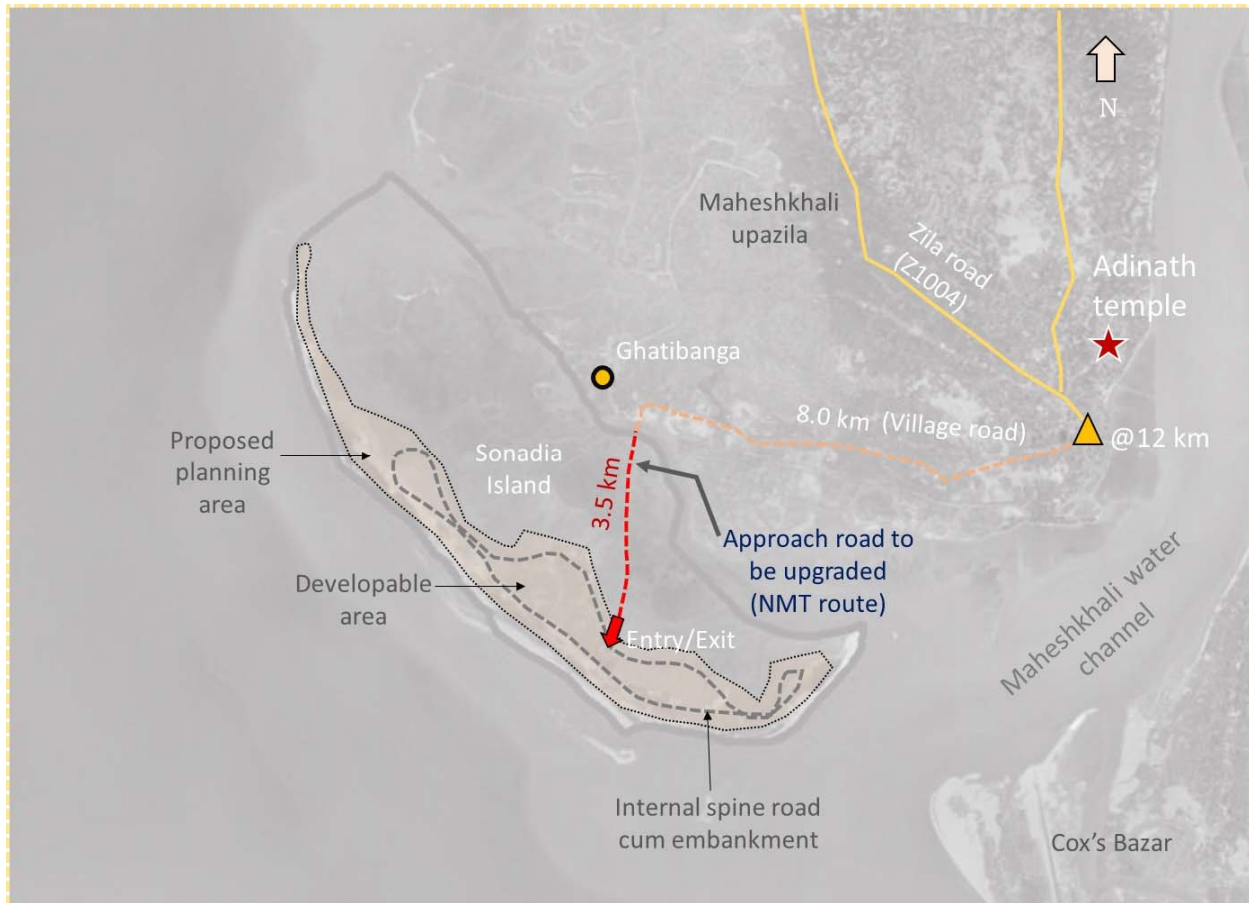


*Source: MACE analysis*

The approach road connecting the planning area is a mud road, and its width is less than 2.75 m. at some stretches within Sonadia Island. It is proposed that there will be an NMT

parking area around 3 acres on Maheshkhali side at the entry of Sonadia Island. From this junction, the tourists will be reaching the SE-TP through e-car via. NMT route for a length of about 3.5 km.

Exhibit No. 13.2: Map of last mile connectivity to proposed SE-TP



**Source:** MACE analysis

**Note:** There is a proposal by the Cox's Bazar Road Division of RHD to construct a new road connecting Gorakghata and Sonadia island for 8 km. Hence only the stretch of 3.5 km has been proposed as approach road development under the Sonadia Eco-Tourism project.

### 13.1.2. Power supply to SE-TP

Based on the assessment, the estimated power requirement for the proposed SE-TP will be around 6.31 mVA.

To cater to this ultimate power demand, the main receiving sub-station of 33/11 kV

substation has to be established within the Sonadia Island to supply the power requirement of SE-TP. Power to this sub-station can be availed from the 33/11 kV Kiranthuli sub-station existing within Maheshkhali Upazila with the total capacity of 10 mVA located at a distance of 15 km from the site is depicted **Exhibit No. 13.3**.



Source: MACE analysis

13.1.3. Water supply to SE-TP

Based on the assessment and demand forecasting for the proposed SE-TP, the total potable water demand is about 2.04 MLD. Based on the interaction with the DPHE officials, it is informed that the groundwater within the Sonadia Island is non-potable due to its saline nature.

Hence it is suggested to develop digging deep tube-wells in Gorakghata area and utilise groundwater till such time the project-specific desalination plant is put into operation.

The proposed alignment of the external potable water supply line to the SE-TP is depicted in Exhibit No. 13.4.



Exhibit No. 13.4: External potable water supply line to the SE-TP



Source: MACE analysis

# Environmental and social assessment

### 14.1. Preamble

The E&S review has been undertaken with the following objectives:

- To facilitate an understanding of the elements of the existing baseline conditions of the project's area of influence;
- To make an inventory of the present socio-economic situation to establish the base condition;
- To identify the aspects of the project likely to result in significant impacts to environmental resources/receptors;
- To analyse and map relevant stakeholders involved in the project;
- To predict the significance of the environmental impacts of the project;
- Assessment of the social impacts of the proposed interventions;
- To identify the people's view about the proposed interventions;
- To develop an understanding of the management and monitoring of impacts;
- Preparation of EMP; and
- Prepare SMP.

Sonadia Island is a small island located to the West of Cox's Bazar, Bangladesh. The Island is ecologically very rich, which is located in Kutubjom union, and it falls under Maheshkhali Upazila. Currently, Maheshkhali is being developed as an economic zone with a large number of infrastructure projects (power generation and deep-sea terminal facility). As such, infrastructure development plans of Maheshkhali will have some impact on the MP&DP of Sonadia Island. Special consideration will be given to avoid any degradation to ecology.

In the SE-TP context, sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability. The poverty reduction, social inclusion and creation of large-scale local employment aspect should include measures to prevent or minimise the potential negative social impacts of SE-TP, such as competition for land, water and other resources, and unwanted social change, including crime and sexual exploitation. This underlines the need to ensure that local communities are consulted, engaged and empowered to influence decisions on SE-TP development and operations that may affect their livelihood and society.

This chapter presents the methodology of E&S review, an overview of environmental, legal, regulatory and policy requirements, baseline data, conservative measures, impact assessment, mitigation measures based on the studies and inferences drawn at feasibility level of investigation. Considering the sensitivity of the proposed site, it can be said that overall the impacts from pre-construction, construction and operation phase will have quite detrimental impacts to the surrounding environment. Many of the impacts are possibly irremediable in nature and can't be replenished. The proposed site is quite rich from an ecological point of view.

As Sonadia Island falls under ECA, a thorough EIA/EMP study needs to be conducted. Hence this chapter also gives a brief of the requirements for conducting the ESMP for the SE-TP site located on Sonadia Island, Cox's Bazar District, Bangladesh. The objective of the ESMP is to develop procedures and plans to ensure that the mitigation measures for identified impacts are implemented throughout the project phases.

Also, ESMP need to ensure the effective long-term protection of the area and other biotic and abiotic components of the environment

Based on the feasibility stage level of studies, this chapter provides key information on the E&S aspects, potentially significant impacts, and mitigation measures which necessarily requires exhaustive study and validation during the implementation of the SE-TP including IRC-CoE&IDC, besides preparation of ESMP as per applicable guidelines.

This chapter also provides the generalised guidelines for E&S safeguard activities for SE-TP infrastructure, including IRC-CoE&IDC development and operations.

### 14.2. Introduction

An environmental assessment is critical to assess the suitability of the proposed project location from an environmental perspective. In addition to environmental assessment, the need for a social assessment is equally important for a better understanding of the social consequences as a result of the development of the SE-TP. The study mapped and analysed the factors that may impact the sustainability of SE-TP significantly. There is a need for an ESMF to outline the principles and procedures of ESMP that would be followed to ensure that implementation of SE-TP meets with the existing Environmental Impact Assessment (EIA) laws of the country, prevailing environmental documents of DoE and DoF and World Bank, UNIDO safeguards policies.

### 14.3. Objectives

The ESMF spells out the E&S safeguards, institutional arrangements and capacity required to use the framework. The approach ensures that subprojects under the SE-TP and listed related, associated and or induced activities in the supporting region and influence region development (IRD) meet the national and local E&S requirements, and also consistent with World Bank and UNIDO safeguards. The ESMF sets out basic principles and processes of which the implementation of sub-projects happens in a manner agreeable to all parties. The other objectives of the ESMF include:

- Assessment of potential adverse E&S impacts commonly associated with the subprojects and the way to avoid, minimise or mitigate them;
- Establishment of clear procedures and methodologies for the E&S planning, review, approval, and implementation of sub-projects;
- Development of an environmental and social assessment screening / initial assessment system to be used for subprojects; and
- Specification of roles and responsibilities and the necessary reporting procedures for managing and monitoring sub-project E&S concerns.

### 14.4. The methodology of E&S review

**Annexure-14B** provides the methodology of E&S review.

### 14.5. Description of the study area

**Chapter 8 – Site assessment** describes the study area.

### 14.6. Description of the project environment

**Annexure-14A** provides the project environment and baseline data.

### 14.7. Social baseline environment

The socio-economic assessments were aimed at examining the socioeconomic conditions of the people living around the project site. This is to ensure that the potential impacts of the proposed SE-TP project are captured and described while proffering solutions to possible negative impacts to human habitat, health and livelihoods.

The specific objectives of the social baseline study include:

- To elicit information about the existing socioeconomic and demographic characteristics of the inhabitants living within the community;

- To document the distributional characteristics of the socioeconomic components in the project area;
  - To analyse the patterns of the relationships of the socioeconomic components;
  - To discuss and deduce the effect of the patterns on the environment of the proposed project through the perceptions of the respondents;
  - To provide a baseline data for the assessment of the socioeconomic impacts of the proposed project; and
  - To suggest mitigation measures and environmental management plan for the proposed project.
- Creation of R&D hub, innovation centre and international product design centre; knowledge hub; skill development centres; quality control and testing laboratories
  - Supporting facilities would include: Health areas, Recreational areas, Play areas and Amenities
  - Specialised infrastructure for tourism, leisure, entertainment, education, research, skill development activities

Adequate environmental infrastructure elements planned in SE-TP include:

- Rainwater harvesting and rejuvenation of water bodies
- Sewage treatment plants
- Recycling of water and reuse of wastewater
- Industrial wastewater infrastructure
- Composting
- Waste to energy
- Recycling
- Sanitary and secured landfill
- Biomedical waste handling
- Hazardous & non-hazardous waste handling

#### 14.8. SE-TP including IRC-CoE&IDC development description

The proposed SE-TP is aimed for the sustained development of the tourism sector and knowledge-based economy sector in Bangladesh. The SE-TP development, including IRC-CoE&IDC, would entail:

- Site grading
- Boundary protection
- Roads and pavement
- NMT
- Pedestrian-friendly walkways
- Public open spaces
- Water storage infrastructure
- Affordable 24x7 treated water supply in sufficient quantity and quality
- Water treatment plants
- Decentralised, networked underground sewerage systems
- Stormwater drainage
- Community and public washroom facilities with provision for differently-abled
- Assured power supply & distribution
- Energy-efficient street lighting
- Open, robust information technology (IT) connectivity and digitalisation, etc
- Creation of entrance zone;

#### 14.9. Policy, legal, the regulatory and institutional framework

The section examined the various regulatory and legal documents as they concern Bangladesh and Sonadia Island governance. The World Bank Safeguards, UNIDO guidelines and other relevant international guidelines applicable to the sub-project intervention were also examined. The E&S assessment must be reviewed both by the National and District-level legislation, guidelines and international conventions that are relevant to the proposed project.

**Table No. 14.1** provides the list of international, National and District-level policy, legal and institutional framework that needs to comply with SE-TP development and operation.

Table No. 14.1: List of international, national policy, legal and institutional framework

International level	
Legal and administrative structure	World Bank environmental and social framework (2016)
	UNIDO (AI/2017/04)
Environmental regulatory instruments	World Bank's safeguards - OP 4.01 Environmental Assessment
	Vienna Convention for the protection of the Ozone layer (September 1988) and the Montreal Protocol for Control of substances that deplete the ozone layer (1987)
	Basel Convention on the prevention of trans-boundary movement of hazardous wastes and their disposal (May 1992)
	CITES (July 1975)
	Convention on Bio-diversity - United Nations Environment Programme (December 1993)
	United Nation Framework Convention on climate change (1992)
	United Nation Convention to Combat Desertification (1996)
	Stockholm Convention on Persistent Organic Pollutants (May 2004)
World Health Organisation (WHO) Health and Safety Component of EIA, 1987	
National Level	
Acts/Rules	The Environment Conservation Act, 1995 and subsequent amendments in 2000, 2002 and 2010
	Environment Conservation Rules, 1997 (Subsequent Amendments in 2002 and 2003)
	Environment Court Act, 2000 and subsequent amendments in 2002
	The Private Forests Ordinance Act, 1959
	The Protection and Conservation of Fish Act, 1950 and subsequent amendments in 1982
	Water Pollution Control Ordinance 1970
	The Ground Water Management Ordinance 1985
	The Embankment and Drainage Act 1952
	Wetland Protection Act of 2000
	The Building Construction Act 1952 (with latest amendment 2006)
	The Vehicle Act, 1927, The Motor Vehicles Ordinance, 1983 The Bengal Motor Vehicle Rules, 1940
	The Factories Act, 1965 Bangladesh Labour Law 2006, amendment 2013 Bangladesh Labour Rules 2015
	Policies
National Environment Management Action Plan 1995	
National Conservation Strategy	
The National Energy Policy, 1995	
The National Water Policy, 2000	
The National Water Management Plan, 2001	

*Source: MACE and DevCon analysis and the compilation from various government websites*

This section highlights the regulatory requirement set out by GoB and World Bank (WB) in relation to the protection of the environment and its resources as well as protection of the

social environment from adverse impacts associated with the project development. These requirements are summarised in **Table No. 14.2.**

Table No. 14.2: Overview of environmental legal, regulatory and policy requirements

Name	Key requirement	Applicability	Remarks
<b>Acts/Rules</b>			
The Environment Conservation Act, 1995 and subsequent amendments in 2000, 2002 and 2010	Mandatory requirement of prior environment clearance for a certain category of the project for conservation and improvement of environment and control and mitigation of pollution of the environment.	Applicable. The project is classified under red category EIA study required to be undertaken	The site approval certificate is to be obtained from DoE
Environment Conservation Rules, 1997 (Subsequent Amendments in 2002 and 2003)	To ascertain responsibility for compensation in case of damage to the ecosystem.  Restriction on polluting automobiles, sale and production of environmentally harmful items.  Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes. Declaration of ecologically critical areas  Promulgation of standard limit for discharging and emitting waste.  Formulation and declaration of environmental guidelines.		
Environment Court Act, 2000 and subsequent amendments in 2002	To give high priority to environment pollution prevention.	Applicable as the project shall have environmental impacts	All the developments to be carried out as per ECR, 1997 and amendments.
The Private Forests Ordinance Act, 1959	Conservation of private forests and for the forestation on wastelands.	Applicable as the tree cutting is involved in the development of off-site facilities	Tree cutting to be carried out after taking permission from Regional Forest Officer, Forest Department
The Protection and Conservation of Fish Act, 1950 and subsequent amendments in 1982	Prohibit or regulate the construction, temporary or permanent of weirs, dams, bonds, embankment and other structures	Applicable. The project involves construction of super dyke and other structures.	Necessary permission would need to be taken for construction

Name	Key requirement	Applicability	Remarks
Water Pollution Control Ordinance 1970	Prevention of water pollution.	Applicable from the perspective of prevention of pollution	Applicable during both the construction stage (e.g. sewage and equipment washing and maintenance liquid waste discharges at construction camps) and operation phase
The Ground Water Management Ordinance 1985	Management of Ground Water Resources.  Tube well shall not be dug in any place without permission from Upazila Parishad.	Applicable. 3-4 nos. bore wells will be dug to develop water supply system during the initial phase	Permission should be taken before digging tube wells
The Embankment and Drainage Act 1952	An Act to consolidate the laws relating to embankment and drainage and to make better provision for the construction, maintenance, management, removal and control of embankments and watercourses for the better drainage of lands and for their protection from floods, erosion and other damage by water.	Applicable. The project proposes the construction of embankment, i.e. super dyke.	Regulatory authority Ministry of Water Resources
Wetland Protection Act of 2000	Adhere to a formal environmental impact assessment (EIA) process, as set out in the Environmental Technical Assistance (ETA) guidelines and manuals for water sector projects or related to alteration of natural drainage.  No construction of roads is likely to affect the flow of navigable waterways without clearance from concerned authorities  Upland flow in water channels to preserve eco-system  Protection against degradation and resuscitation of natural water- bodies such as lakes, ponds, beels, khals, tanks, etc. affected by human-made interventions or other causes.	Applicable. The proposed site is located entirely in the submerged area.	Permission to be taken from the Ministry of Water Resources and DOE.

Name	Key requirement	Applicability	Remarks
	<p>Completely stop the filling of publicly-owned water bodies and depressions in urban areas for the preservation of the natural aquifers and environment.</p> <p>Stop unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.</p>		
The Building Construction Act 1952 (with latest amendment 2006)	An Act to provide for the prevention of haphazard construction of building and excavation of tanks which are likely to interfere with the planning of certain areas in Bangladesh	Applicable as the project involves the development of infrastructure	The regulatory authority is the Ministry of Works
The Vehicle Act, 1927 The Motor Vehicles Ordinance, 1983 The Bengal Motor Vehicle Rules, 1940	To regulate vehicular exhaust emissions	Applicable as heavy vehicle movement is involved both during construction and operation phase	Regular maintenance and up keeping of the vehicles should be carried out. The regulatory authority is the Bangladesh Road Transport Authority
The Factories Act, 1965 Bangladesh Labour Law 2006, amendment 2013 Bangladesh Labour Rules 2015	This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions.	Applicable as the workers will be employed during construction and operation phase	The regulatory authority is the Ministry of labour
<b>Policies</b>			
National Environment Policy, 1992	For sustainable development	Applicable for all development projects	Usage of energy-efficient building material, fuel etc. should be encouraged
National Environment Management Action Plan 1995	Conservation of natural habitats, biodiversity, energy, sustainable development and improvement of life of people	Applicable for all development projects	Usage of energy-efficient material, green building techniques, reduction of carbon footprints etc.
National Conservation Strategy	Sustainable development of Industrial Sector	Applicable for all development projects	Usage of energy-efficient material, green building techniques, reduction of carbon footprints etc.



Name	Key requirement	Applicability	Remarks
The National Energy Policy, 1995	Protecting the environment by requiring an ETA for any new energy development project, the introduction of economically viable and environmentally friendly technology.	Applicable. ETA study is to be carried out	Energy-efficient materials and techniques should be explored
The National Water Policy, 2000	To ensure efficient and equitable management of water resources, proper harnessing and development of surface and groundwater, availability of water to all concerned and institutional capacity building for water resource management	Applicable. Ground and surface water is required to be withdrawn for fulfilling the water requirement	Conjunctive use of water should be explored
The National Water Management Plan, 2001	Addresses options for water quality, considerations behind measures to clean up industrial pollution, where effluent discharge monitoring and zoning regulations for new industries are emphasised	Applicable as the proposed development will involve the generation of sewage	Installation of sewage treatment facility within the premises
World Bank's safeguards			
OP 4.01 Environmental Assessment	Ensures sustainability and environmental feasibility of the project. Projects are classified into A, B & C category depending on the nature and extent of the impact	Triggered	Project classified as Category A considering impacts of the project

Source: DevCon analysis

#### 14.10. Approach for ESMF study

The scope of ESMF activities includes detailed study adhering to the regulations and guidelines. The ESMF study should be conducted post-approval of the MP&DP studies before the start of any site activities. The task would include Environmental screening and scoping;

Environmental policy and regulatory framework; Potential positive and negative E&S impacts; Analysis of E&S mitigation principles; Development of ESMP to mitigate negative impacts; Institutional framework; Training needs; and Public Consultation and preparation of ESMP. **Table No. 14.3** provides the considerations for ESMF study and ESMP preparation.

**Table No. 14.3: Considerations for ESMF study and ESMP**

#### Environmental screening and scoping:

The E&S screening process aims to determine if and what E&S review and management are required, quickly identifying those projects where no potential E&S issues exist so that only those with potential E&S implications will be required to undergo more detailed assessments.

The ESMF coverage should include SE-TP and influence region, and ESMF shall apply to significant adverse E&S management risks, impacts, and mitigation resulting from the following:

1. Investments made in SE-TP including infrastructure and other tourism-related activities and research activities including private investment by occupant units/tenants in the SE-TP designated areas
2. Investment towards developmental activities in the influence region, including investment for SE-TP support activities' in the influence region

#### **Policy, legal and institutional framework:**

ESIA and ESMP must be prepared based on the national level and international guidelines. The analysis should consider country legislation, guidelines and international conventions that are relevant to the proposed project, including Government laws and regulations as well as international conventions and other instruments. Further, compliance with the World Bank and UNDO Safeguard Policies are required.

World Bank has 10+2 E&S Safeguard Policies to reduce or eliminate the adverse effects of development projects, and improve decision making for supported projects. These include Environmental Assessment; Natural Habitats; Pest Management; Indigenous peoples; Physical Cultural Heritage; Involuntary Resettlement; Forest; Safety of Dams; Projects on International Waterways (if applicable); Projects in Disputed Areas (if applicable). About environmental assessment (EA,) the impacts from proposed IRD and SE-TP are sensitive, diverse, and unprecedentedly, felt beyond the immediate project environment and are potentially irreversible over the long term, thus requiring full EA.

The UNIDO's Integrated Safeguard Policy statement (ISPS) sets out the basic tenets that guide and underpin UNIDO's approach to environmental safeguards. Also, UNIDO has adopted 12 Operational Safeguards (OSs), limiting their number to what is required to achieve the goals and optimal functioning of the ISPS. These include:

- ✚ **Programmatic Operation Safeguards:** OS 1: E&S Assessment; OS 2: Protection of Natural Habitats and Bio-diversity; OS 3: Involuntary Resettlement and Land Acquisition; OS 4: Indigenous People; OS 5: Pest Management; OS 6: Cultural Heritage; OS 7: Safety of Dams; OS 8: Labour and Working Conditions; OS 9: Resource Efficiency and Pollution Prevention; OS 10: Community Health, Safety and Security
- ✚ **Framework Operational Safeguards:** OS 11: Information Disclosure and Stakeholder Consultation; OS 12: Community Health, Safety and Security

OS 1 is an overarching safeguard providing the framework for the required E&S screening and assessments that a project should undergo. This OS also determines whether proposed projects could potentially involve activities or components that pose any specific risks covered by OSs 2-10 and whether any of these OSs need to be triggered.

Project-level OS 2-10 ensure that a precautionary approach is applied in the proposed project, and potential adverse impacts and risks to the environment, natural habitats, local communities, labour force, and indigenous people, and cultural heritage are avoided or minimised if possible and mitigated if not. These OSs are triggered by the E&S screening and assessment procedure undertaken as part of OS 1.

Framework Operational Safeguards, OS 11 and 12, provide overarching frameworks on UNIDO's information disclosure and consultation requirements and the accountability and grievance systems.

**Annexure – 14E** provides the requirement for the compliance with UNIDO guidelines, and the ESMP detailed study should address the elements mentioned in the guidelines.

However, in the event of divergence between the National policies and World Bank/UNIDO policies about IRD and SE-TP, the more stringent safeguard policy shall take precedence.

**IRD and SE-TP require:**

- Early consideration of E&S issues (starting at the screening stage);
- Activities include identification and early consultation with stakeholders;
- Prevention of adverse impacts through the consideration of feasible alternatives; and
- Strategies include incorporation of mitigation measures into planning and (engineering) design.

**Biophysical and socio-economic environment:**

A collection of data and baseline data establishment for ESIA studies:

**Location**

Physical environment: climate; Air quality; geology; relief and drainage; soils characteristics; hydrology

Biological Environment: Fauna; vegetation; protected areas and sensitive habitats; drivers of vegetation cover change; ecological problems

Socio-economic background of the project area and environs:

- A brief history of the region; The core area of the SE-TP and influence-region development; administrative structure; local dispute resolution procedure; literacy;
- Agricultural production and livelihoods; women and their right to ownership of farmland in the IRD communities;
- Vulnerable people;
- Land competition and conflict;
- Land tenure and land use across the IRD;
- Infrastructure (road and electricity);
- Water supply for domestic use;
- Health facilities and prevalent diseases

**Potential E&S impacts:**

**E&S screening process:** The screening process is the first step in operationalising the ESMF process. The objective of screening is to identify those subprojects that have minimal/no R concerns. The strategies include the development of a checklist of items for adherence towards conforming to the provisions of ESMF. The extent of elaboration of E&S work that might be required for the project before implementation will depend on the outcome of the screening process. Subprojects triggering significant E&S impacts are mapped categorised as "A." Thus, the approach is to clear the various sub-projects for implementation after undertaking the necessary E&S assessments, as mandated by the applicable Environmental laws (national) and conforming to the safeguard policies of the World Bank.

**Environmental screening criteria:** The screening shall provide information on the categories of project activities for inclusion in the project and categories of project activities to be excluded from sensitive areas through exclusion criteria. The screening criteria include the following, among other things:

- Environmental factors such as;
  - Sensitive areas, natural habitats, declared forest reserves and sensitive areas;
  - Felling of trees/clearance of non-agricultural vegetative cover;
  - Loss of productive agricultural land; Impacts on Seasonal (non-perennial) streams/rivers;

- Vulnerability to natural hazards, landslides/slips where slope angle is greater than 40%, soil erosion; and,
  - Environmental features as wetlands protected groundwater zone
- Social factors such as;
- Land availability to peasant farmers particularly small-hold farming;
  - Loss of structures including farmlands and ancestral land;
  - Loss of livelihood including farmlands and economic trees;
  - Impacts on common property resources

#### Project-level E&S reviews:

Any significant E&S issues that may arise would be addressed and mitigated through an ESMP.

#### ➤ E&S impact assessment:

Step 1: Scoping and Terms of Reference
Step 2: Baseline Data Collection
Step 3: Identify Environmental Impacts
Step 4: Design Mitigation Measures
Step 5: Public Consultation and Participation
Step 6: Develop ESMP
Step 7: Prepare ESIA Report
Step 8: Clearance

#### ➤ The method of impact assessment for the ESMP:

In the development of the potential impacts, E&S issues need to be identified and listed in a checklist. These need to be presented to the individuals at the stakeholder meetings and the representatives of the organisations met during the consultations. Based on the local knowledge of the stakeholders and the available literature and field survey, the activities include identification of common issues. Based on this, activities encompass the preparation of a simplified environmental impact matrix that links project activities with some socio-environmental components.

#### Potential impacts:

IRD and SE-TP development and operation are envisaged to have a range of positive E&S impacts. Some of these are a function of the objectives of the project, while others are a function of the way in which the project is designed to meet its objectives.

#### ○ The potential positive impacts

- The project beneficiaries are the population of rural communities and tourism value chain actors, domestic and foreign tourist apart from attracting investments in identified growth engines of the region and the country
- Specifically, the following are some of the benefits that could be due to the project:
  - Improved employment opportunities;
  - increased SME industries activities;
  - food security; poverty alleviation; elevation of rural income and national economy; improved nutrition; employment creation for community members; empowerment of women enhanced gender opportunities; improved infrastructure; improved health care; attainment of the industrial growth/transformation/vision or agenda of the government

o **The potential negative impacts**

- Sonadia Island is one of the nesting sites of turtles. The Island is known as sea turtles breeding ground and offers a sandy shore area for nesting. The major threats for the species of turtles are presented in **Annexure-14E**.
- Sonadia Island has been declared as 20<sup>th</sup> Important Bird Area of Bangladesh, and the threats arising out of SE-TP implementation need to be properly understood;
- On the other hand, the implementation of the project would exert some negative impacts on the social and physical environment. Activities include identification of these impacts and mapping of the issues relevant to or applicable to the local environments of the proposed project area.
- **Table No. 14.4** explains impact due to tourism-related facilities, research facilities and infrastructures development

**Table No. 14.4: Tourism-related facilities, research facilities and infrastructure-related activities**

<b>Region development activities:</b>
<b>Development of physical infrastructure:</b> site grading, boundary protection, roads and pavement, NMT, pedestrian-friendly walkways, public open spaces, water storage infrastructure, affordable 24 x 7 treated water supply in sufficient quantity and quality, water treatment plants, decentralised, networked underground sewerage systems, stormwater drainage, community and public restrooms with provision for differently-abled, assured power supply and distribution, energy-efficient street lighting.
<b>Development of environmental infrastructure:</b> Rainwater harvesting and rejuvenation of water bodies, sewage treatment plants, recycling of water and reuse of wastewater, wastewater infrastructure, composting, waste to energy, recycling, sanitary and secured landfill.
<b>Development of tourism infrastructure:</b> Entrance zone, heritage and hospitality zone, knowledge centre zone, family entertainment zone, adventure zone, eco-science zone.
All with the following common activities:
Site clearing and levelling, compacting & blasting, use of heavy equipment and hazardous materials, material extraction/quarrying, slope stability/excavation, cutting, and filling, hazardous materials storage and disposal, waste management, construction camp and crew set up, and land use/land take
<b>Analysis of impact: environmental</b>
Bio-diversity, water resources and drainage, soils and slope stability/excavation, cutting, and filling, air quality and noise, use of heavy equipment and hazardous materials, waste management
<b>Analysis of impact: Social</b>
Land use/land take, construction - camp and crew, utility disruptions, safety and security, public and occupational health and safety, cultural heritage, social tension, maintenance

As a part of the E&S review, the likely impact was carried out considering the present environmental setting of the project area, and nature and extent of the proposed activities. The

proposed project involves the development of tourism facilities and off-site facilities. Potential environmental impacts associated with tourism developments are classified as:

- Impacts during design/pre-construction phase;
- Impacts during the construction phase; and
- Impacts during the operation phase.

At the feasibility level stage study, based on the nature of proposed facilities, the likely impact on the surrounding environment is discussed. However, the detailed analysis of specific impacts on the basis of scale and magnitude of the individual developments should be carried out at a later phase of design along with more specific mitigation measures. During the study, sensitive environmental components were identified during the site visits, and qualitative and quantitative techniques have been applied for direct and indirect assessment of impacts on these components.

As a part of the feasibility study level E&S review, **Annexure-14B** provides the E&S impact due to development and operation of SE-TP, including IRC-CoE&IDC.

#### **Cumulative E&S impacts:**

Even though there may be no long-term or cumulative adverse E&S impacts of activities of IRD and SE-TP project, the combination of multiple impacts from existing projects, the proposed project, and anticipated future project activities may result in significant negative and positive E&S impacts. On the other hand, in the case of a standalone project, there could be the absence of this impact.

The cumulative impacts of the project may potentially affect other areas coterminous to the project area, but the mitigation measure for this risk is that in-depth technical and spatial analysis needs to be conducted to model the impact of the proposed subprojects once sufficient details are known and thus limit the risks.

#### **Assessment of no-project and go-ahead project alternatives:**

Analysis of alternatives is done to establish the preferred or most environmentally sound, financially feasible and benign option for achieving project objectives. The analysis requires a systematic comparison of proposed investment design regarding the site, technology, processes, etc. regarding their impacts and feasibility of their mitigation, capital, recurrent costs, suitability under local conditions and institutional, training and monitoring requirements. For each alternative, activities include quantification of the environmental cost to the extent possible and economic values attached where feasible, and the basis for selected alternative stated. The analysis of alternative should include a NO ACTION alternative. The criteria of analysis include overall protection of the environment and social well-being; long-term effectiveness and Permanence; compliance with applicable or relevant appropriate requirements; short-term effectiveness.

#### **E&S mitigation measures:**

The Objective of the ESMF is to provide a framework for preventing and mitigating the negative impacts associated with project implementation.

#### **Approach to developing mitigation measure**

Options to address the various E&S issues identified are worked out based on a review of good practices and requirement of compliance with the legal provisions as well as consultations with the relevant stakeholders. **Table No. 14.5** outlines the principle that guides the approach to mitigation measure development.

Table No. 14.5: Mitigation measure

Mitigation measure	Practice
Seek alternatives to avoid impacts.	<ul style="list-style-type: none"> <li>Consider alternatives to the proposed project activity.</li> <li>Examine alternative ways to achieve the objectives to maximise benefits and minimise undesirable impacts.</li> </ul>
Arrange compensation where impacts are unavoidable.	<ul style="list-style-type: none"> <li>Restore damaged resources, such as water source, irrigation system, forest.</li> <li>Proper rehabilitation scheme, such as skills training, new employment.</li> <li>Adequate compensation payments to affected persons for damage or loss of property, livelihood, and provision of rehabilitation measures.</li> </ul>
Take corrective measures to reduce unavoidable effects.	<ul style="list-style-type: none"> <li>Consider corrective measures to reduce adverse impacts to acceptable standards, such as, remove spoil material during construction, replace or relocate community water source, assist in school expansion to handle the influx of labourers' children and others.</li> </ul>
Implement preventive measures to avoid some effects altogether.	<ul style="list-style-type: none"> <li>Pre-preparation for minimising adverse impacts, such as implement health education program, initiate public awareness programs.</li> </ul>

**Mitigation measures:**

Based on the impacts, **Table No. 14.6** suggests mitigation measures to address potential problems and effects.

Table No. 14.6: Suggested measures

**Enhancement of positive impacts and reduction/avoidance of negative impacts**

A Mechanism for Enhancement of Positive Impacts and Reduction/Avoidance of Negative Impacts has to be developed covering gender mainstreaming and vulnerability assessment; waste management plan; bio-diversity loss and soil management; forest reserve management and water body; managing pastoralist conflicts; chance finds protocols.

Based on feasibility level E&S review, the conservative measures for turtles, birds, crabs, Mangroves and other E&S safeguards are discussed in **Annexure-14E**.

Also, the **Annexure-14E** provides the mitigation measures for various E&S impacts identified at the feasibility study level.

**Public involvement consultation:**

The objectives of the consultations typically include:

- Inform the affected communities within the IRD of the project development objective,
- Give them the opportunity to express their perceptions and concerns about the project impact;
- Collect useful local data/information/solutions that will help in the ESMF/ESMP/ESIA project preparation (e.g. Local grievance redress procedures).
- Learn about the present socio-economic conditions of the study area and its existing scenario, problem, prospect and improvement;

- Try to build up awareness among the local people and society members about the project, its nature and implementation process;
- Encourage the local community to participate in the planning and implementation process;
- Identify and mitigate conflict of interest among the groups;
- Learn about people's participation on the impact of proposed interventions;
- Receive from, and deliberate with the stakeholders on measures to avoid or mitigate impacts as well as facilitate rehabilitation of affected persons;
- Obtain people's suggestions on the enhancement measures of the positive impact, and identify solutions to the apparent problems related to the project and ideas on mitigating the negative impacts; and
- Empower their voice by mainstreaming their inputs into the ESMF/ESIA implementation plan.

The preparation of ESMF shall include consultations with relevant government agencies, communities and social groups within the IRD and SE-TP. Robust consultation is essential, and the key activity areas would include objectives of public involvement/consultations, including devising a mechanism for consultation and participation.

Identifying stakeholders; proposed ESMF and public involvement; ESMF communication plan; a mechanism for engagement/consultation of PAPs; tools for consultation of stakeholders; plan for future consultations and communication.

As a part of feasibility level of SIA, a stakeholder consultation was conducted to assess the opinion of local people who will be impacted due to project intervention. Consultations have been conducted by arranging 5 sessions of FGDs with local people for assessing their opinion and to share their experiences. Ten Key Informant Interviews were conducted to explore the views of the informants. Consultations were carried out with different stakeholders like local government representatives; local influential people, the business community, women group, etc., A participatory approach was followed for conducting public consultation meetings. The checklist has been prepared for conducting the meetings to maintain consistency and relevancy in discussion and recorded the views and perceptions of the participants. Socio-economic and some environmental issues have been discussed in detail, including potential impacts of the interventions on environmental and social parameters. These aspects are discussed in the [Annexures-14A to 14G](#).

#### **ESMF implementation and management:**

The successful implementation of the ESMF depends on the commitment of the sector and related institutions, and the capacity within the institutions to apply or use the framework effectively, and the appropriate and functional institutional arrangements, among others. Hence these key ESMF areas relevant to its successful implementation include: institutional arrangements, capacity building, E&S monitoring

#### **Institutional arrangements:**

The activity also includes analysing the roles and responsibilities of the various institutions relevant to the successful implementation of the ESMF including the establishment of project management unit; E&S safeguards unit

#### **ESMF communication plan**

The ESMF communication plan refers to specific guidelines and protocols consistent with the principles of participation that will govern the project. Communication plans, including the communication plans of the social safeguard frameworks of the project, articulate these aspects.

#### **Measures for strengthening organisational capability - capacity building and training:**

The capacity assessment of implementing agencies is important. There is a need for capacity building and strengthening of relevant competencies on E&S management at National and District level agencies. It involves organisational development, the elaboration of management structures,



processes and procedures, within not only organisations but also the management of relationships between the different organisations and sectors (public, private and community).

Limited technical skills and resource constraints hinder effective functioning. Thus, institutional barriers include:

- Limited knowledge of the relationship between the World Bank and UNIDO Safeguards Policies and the extent of E&S laws in the country;
- Lack of enforcement of development control regulations;
- Limited knowledge on EIAs and E&S audits during construction/rehabilitation of drainages and culverts;
- Limited knowledge of strategic E&S assessment;
- Limited monitoring of water quality, river flow and lack of systemic hydrologic data collection; and
- Limited technical capacity for solid waste management.

The areas of competencies and capacity building include:

- Environmental impact assessment process - screening, scoping, impact analysis, mitigation measures and monitoring, reviewing ESIA reports;
- Environmental due diligence - types of due diligence, screening projects for liabilities, scoping due diligence investigations and reviewing due diligence reports; and
- Monitoring and evaluation - understanding the importance of monitoring and evaluation (M&E) in project implementation, M&E requirements for E&S sustainability of projects.

#### **Grievance mechanism:**

The grievance redress mechanism is part of the broader process of stakeholder engagement, accountability, quality and compliance assurance in the IRD and SE-TP designed to solving disputes at the earliest possible time, which is in the interest of all parties concerned. The activities would include grievance management process; composition of grievance redress committee; independent mediation committee

#### **E&S monitoring:**

Monitoring is a key component of the ESMF during project implementation. Monitoring verifies the effectiveness of impact mitigation measures, including analysing the extent of implementation of mitigation measures. Monitoring specifically helps to:

- Improve E&S management practices;
- Check the efficiency and quality of the ESMP processes;
- Establish the scientific reliability and credibility of the ESMP for the project and
- Provide the opportunity to report the results on safeguards and impacts and proposed mitigation measures implementation.

Methods for monitoring the implementation of mitigation measures or E&S impacts should be as simple as possible, consistent with collecting useful information so that the subproject implementer can apply them.

Based on the feasibility stage level review, the EMP and SMP for the proposed SE-TP development and operations are presented in **Annexure-14C and Annexure-14D**.

The approach for E&S safeguard mitigation measures for SE-TP development and operation, the checklist of the generic E&S mitigation measures are presented in **Annexure-14E and Annexure-14F**.

Further, some of the recommendations made for the project development based on E&S review at the feasibility study level include:

- A detailed EIA should be carried out by BEZA before any site preparation/construction activity and prior environment clearance certificate from DoE, Bangladesh should be taken.
- Construction activities for the development of the project should be started after obtaining an environment clearance certificate from DoE, Bangladesh.
- A half-yearly ecological assessment (preferably in winter and monsoon) during preconstruction, construction, operation phase should be conducted by environment specialists to record chronological trend of biodiversity in the project area surrounding.
- Wildlife awareness program among the workers (during preconstruction, construction and operation phase) should be conducted. Workers should report the sighting of any uncommon species to the environmental expert, who immediately should inform the incidence to local forest/wildlife authority/ conservationists.
- The proposed EMP should be implemented strictly during preconstruction, construction and operation phase of the project.
- Green area development should be carried out.
- Proper training of maintaining the environment, health and safety should be given to project implementation unit in preconstruction, construction and operation phase.
- Provision of garland drain, thick green belt, STP, segregated stormwater.
- Environmental monitoring should be conducted, as suggested in the environmental management plan.
- Separate environment impact assessment study must be carried out by the developer for the whole zone before developing SE-TP.

#### **Environmental code of conduct, social integration, and participation:**

- The procedures for an Environmental Code of Conduct for contractors, if followed, would yield benefits for a longer period regarding financial and environmental sustainability. As a matter of principles, Social inclusions or community participation in various aspects of the project/subprojects shall be managed, in particular through the inclusion of conditions that involve measures towards Community participation. These aspects are discussed in **Annexure-14G**;
- Measures include Integration with host populations & promotion of social inclusion;
- Social Inclusion & Avoidance of elite Capture/ Vulnerable groups;
- Gender issues;
- Avoidance of promotion of any conflict among community groups; Implementation Arrangements: Accountability in the use of public funds;
- Grievance procedures and project monitoring.

#### **Budgets for the ESMF**

To effectively implement the E&S management measures suggested as part of the ESMF, necessary budgetary provisions need to be made covering routine E & S duties; Capacity Building for the Implementation agencies and other stakeholders; engagement of E&S Specialists; E&S Due Diligence investigations and or Audits; ESIA Studies; Monitoring and evaluation activities

*Source: MACE analysis*

**List of annexures and appendix:**

Annexure-14A: Description of the project environment

Annexure-14B: Description of E&S impact

Annexure-14C: Environmental management plan and monitoring indicator

Annexure-14D: SMP

Annexure-14E: Approach for E&S mitigation measures including safeguard activities in SE-TP development and operations

Annexure-14F: Generic E&S mitigation measures checklist

Annexure-14G: Indicative environmental code of conduct and clauses for contractors

Appendix-2: Baseline data

## Chapter – 15

# Development strategy and private sector participation

### 15.1. Development approach

This project is first of its kind in Bangladesh conceptualised for the sustainable and holistic development of tourism sector, destination development of Sonadia Island and creation of large-scale employment opportunities in Bangladesh and hence appropriate model needs to be developed.

The implementation of SE-TP development zones and development elements or individual tourism components or tourism infrastructure elements encompasses options like government interventions or PPP mode or entirely by the private sector. The PPP model of development of infrastructure projects involving different actors utilises the concept of SPVs. SPVs are formed specifically for the identified projects and are the legal entities implementing and operating the project.

The development of the SE-TP common infrastructure like physical infrastructure, environmental infrastructure, renewable energy infrastructure etc. shall be under the control of the SE-TP:PIU created within BEZA to manage the implementation of SE-TP. Also, the overall development of specialised tourism infotainment zones like entrance zone, heritage and hospitality zone, family entertainment zone, adventure zone, eco-science zone and knowledge centre zone shall also be under the control of SE-TP:PIU. The PIU being formed under BEZA shall have representatives from GoB and other stakeholders.

The O&M of the SE-TP common infrastructure shall be under the control of SE-

TP:SPV. The SE-TP:SPV will be entirely a private sector entity. Alternatively, the SE-TP:SPV can be formed as a joint venture with the private sector.

The execution of SE-TP connectivity and external infrastructure shall be through the third party, and SE-TP:PIU shall actively involve in monitoring the progress of these activities and perform effective coordination for timely completion of these activities.

Further, the development and management of components within the identified infotainment zone and knowledge centre zone like convention centre, MICE and budget hotel, arts and crafts village, multi-cuisine restaurant, heritage pavilion, resorts, IRC-CoE&IDC, greenhouses and agro-tourism, botanical garden etc., shall be under the control of separate tourism and knowledge zone component SPV (TKZC:SPV) and shall be monitored by BEZA or government agencies appointed by BEZA. The TKZC:SPV will be entirely a private sector entity. Alternatively, the TKZC:SPV can be formed as a joint venture with the private sector.

It is necessary that all the stakeholders should be involved in carrying out the implementation of MP&DP.

**Table Nos. 15.1 to 15.3** explains the development approach adopted for each development element of SE-TP comprising of SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure; and TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries.

**Table No. 15.1: Summary of implementation, investment and viability analysis approach adopted for each development zone of SE-TP – SE-TP common infrastructure including specialised tourism infrastructure but outside the periphery of earmarked TKZC**

Development mode including the scope of activities of SE-TP:PIU, SE-TP:SPV, TKZC:SPV, investment and viability	
Major head	<ul style="list-style-type: none"> <li>SE-TP common infrastructure including specialised tourism infrastructure, but outside the periphery of earmarked TKZC</li> </ul>
Development activities	<p>Following activities denoted as “common infrastructure within SE-TP.”</p> <p><b><u>Physical infrastructure</u></b></p> <ul style="list-style-type: none"> <li>Site grading</li> <li>Boundary protection</li> <li>Roads and pavement</li> <li>NMT</li> <li>Pedestrian-friendly walkways</li> <li>Public open spaces</li> <li>Water storage infrastructure</li> <li>Affordable 24 x 7 treated water supply in sufficient quantity and quality</li> <li>Water treatment plants</li> <li>Decentralised, networked underground sewerage systems</li> <li>Stormwater drainage</li> <li>Community and public restrooms with provision for differently-abled</li> <li>Assured power supply and distribution</li> <li>Energy-efficient street lighting</li> </ul> <p><b><u>Environmental infrastructure</u></b></p> <ul style="list-style-type: none"> <li>Rainwater harvesting and rejuvenation of water bodies</li> <li>Sewage treatment plants</li> <li>Recycling of water and reuse of wastewater</li> <li>Wastewater infrastructure</li> <li>Composting</li> <li>Waste to energy</li> <li>Recycling</li> <li>Sanitary and secured landfill</li> </ul> <p><b><u>Renewable energy</u></b></p> <ul style="list-style-type: none"> <li>Solar PV</li> </ul> <p><b><u>Selected tourism infrastructure</u></b></p> <ul style="list-style-type: none"> <li>Various TAF not covered under the scope of TKZC:SPV</li> </ul>
SE-TP:PIU – scope and mode of execution	<ul style="list-style-type: none"> <li>Providing requisite financing and developing common infrastructure within SE-TP;</li> <li>Major activity: common infrastructure within SE-TP;</li> <li>These works are executed through EPC and O&amp;M mode or conventional contract route; and</li> <li>Compliance monitoring of the development of common infrastructure within SE-TP.</li> </ul>
Source of investment for SE-TP:PIU	<ul style="list-style-type: none"> <li>The capital expenses are funded through a contribution from BEZA to the SE-TP:PIU without interest on a non-repayment basis.</li> </ul>

Development mode including the scope of activities of SE-TP:PIU, SE-TP:SPV, TKZC:SPV, investment and viability	
SE-TP:SPV – scope and mode of O&M	<ul style="list-style-type: none"> <li>• Providing requisite financing and O&amp;M of established SE-TP common infrastructure which includes external connectivity to the identified infotainment zones and knowledge centre zone and select physical, environment, social, tourism-related infrastructure in the common areas of SE-TP;</li> <li>• A major activity for O&amp;M: SE-TP Common infrastructure;</li> <li>• The O&amp;M activities are carried out through either in-house team of SE-TP:SPV or through outsourcing mode; and</li> <li>• Compliance monitoring of the operation of SE-TP.</li> </ul>
The revenue stream for SE-TP: SPV and viability analysis	<ul style="list-style-type: none"> <li>• The sustenance of the SE-TP:SPV is achieved through leisure, entertainment, education, stay, food courts, tariff from tourists, vehicle parking; margins from food and beverages, souvenirs, and other tourism-related aspects; financial and maintenance charges to be levied on selective users in SE-TP and revenue from TKZC:SPV.</li> </ul>
The scope of other agencies	<ul style="list-style-type: none"> <li>• The internal development and O&amp;M activities including financing of TKZC are to be performed by respective private companies/developers/ parties, collectively denoted as TKZC:SPV complying to the development control regulations of SE-TP; and</li> <li>• The respective occupant units of IRC-CoE&amp;IDC located within the knowledge centre zone shall establish and operate the units. The internal development, financing and O&amp;M activities within knowledge centre zone allotted area are to be performed by respective private companies/occupant units complying with the development control regulations of SE-TP, TKZC and knowledge centre zone.</li> </ul>
Specific exclusion from the scope of SE-TP:PIU, SE-TP:SPV, and TKZC:SPV	<ul style="list-style-type: none"> <li>• The investment, management and performance of TKZC:SPV and occupant units of IRC-CoE&amp;IDC located within knowledge centre zone are out of the purview of SE-TP:PIU, SE-TP:SPV and TKZC:SPV.</li> </ul>

*Source: MACE analysis*

**Table No. 15.2: Summary of implementation, investment and viability analysis approach adopted for SE-TP connectivity and external infrastructure**

Development mode including the scope of activities of SE-TP:PIU, SE-TP:SPV, TKZC:SPV, investment and viability	
Major head	<ul style="list-style-type: none"> <li>• SE-TP connectivity and external infrastructure.</li> </ul>
Development Zone	<ul style="list-style-type: none"> <li>• Offsite linkages to SE-TP.</li> </ul>
Source of investment	<ul style="list-style-type: none"> <li>• The capital expenses are funded through a contribution from GoB without interest and on a non-repayment basis.</li> </ul>
SE-TP:PIU – scope and mode of execution	<ul style="list-style-type: none"> <li>• The execution through third party government agencies;</li> <li>• Major activities: Access to SE-TP: power supply to SE-TP; telecommunication connectivity;</li> <li>• Further, the SE-TP:PIU shall actively involve in monitoring the progress of these activities and perform effective coordination for timely completion of these activities.</li> </ul>

Development mode including the scope of activities of SE-TP:PIU, SE-TP:SPV, TKZC:SPV, investment and viability	
SE-TP:SPV – scope and mode of O&M	<ul style="list-style-type: none"> <li>The O&amp;M through third party and financing of connectivity and off-site infrastructure activities; and</li> <li>However, the SE-TP:SPV shall actively involve in monitoring the progress of O&amp;M activities and perform effective coordination for quality delivery of services.</li> </ul>
Viability analysis for SE-TP:SPV	<ul style="list-style-type: none"> <li>Not applicable since O&amp;M of this infrastructure is excluded.</li> </ul>
The scope of other agencies	<ul style="list-style-type: none"> <li>The development and O&amp;M of the approach feeder road, electricity supply and telecommunication by concerned government agencies;</li> </ul>
Specific exclusion from the scope of SE-TP:PIU, SE-TP:SPV, TKZC:SPV	<ul style="list-style-type: none"> <li>The actual execution and O&amp;M shall be done by respective government agencies (third-party organisation).</li> </ul>

*Source: MACE analysis*

**Table No. 15.3: Summary of implementation, investment and viability analysis approach adopted for each development zone identified within SE-TP –TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries– full zones or separate TKZC**

Development mode including the scope of activities of SE-TP:PIU, SE-TP:SPV, TKZC:SPV, investment and viability	
Major head	<ul style="list-style-type: none"> <li>TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries - Infotainment zone like entrance zone, heritage and hospitality zone, family entertainment zone, adventure zone, eco-science zone and knowledge centre zone – full zones or separate TKZC. Further separate TKZC can also include individual TAF and IRC-CoE&amp;IDC</li> </ul>
Development zone or activity	<ul style="list-style-type: none"> <li>Full zone/ one or more TAF and IRC-CoE&amp;IDC development.</li> </ul>
SE-TP:PIU – scope and mode of execution	<ul style="list-style-type: none"> <li>Providing requisite financing and developing SE-TP common infrastructure which includes external connectivity to infotainment zone or knowledge centre zone or to the particular TKZC as applicable and select physical, environment, social, tourism-related infrastructure in the common areas of SE-TP;</li> <li>Major activity: SE-TP common infrastructure;</li> <li>These works are executed through EPC and O&amp;M mode or conventional contract route;</li> <li>Selection of TKZC:SPV through the transparent procurement process and entering concession agreement stipulating the terms of development and operation of TKZC under PPP mode; and</li> <li>Compliance monitoring of the development of TKZC:SPV.</li> </ul>
Source of investment for SE-TP:PIU	<ul style="list-style-type: none"> <li>The capital expenses are funded through a contribution from BEZA without interest and on a non-repayment basis.</li> </ul>
SE-TP:SPV – scope and	<ul style="list-style-type: none"> <li>Providing requisite financing and O&amp;M of established SE-TP common infrastructure which includes external connectivity to the identified infotainment</li> </ul>

Development mode including the scope of activities of SE-TP:PIU, SE-TP:SPV, TKZC:SPV, investment and viability	
mode of execution	<p>zones and knowledge centre zone and select physical, environment, social, tourism-related infrastructure in the common areas of SE-TP;</p> <ul style="list-style-type: none"> <li>• A major activity for O&amp;M: SE-IP common infrastructure;</li> <li>• The O&amp;M activities are carried out through either in-house team of SE-TP:SPV or through outsourcing mode; and</li> <li>• Compliance monitoring of the operation of TKZC:SPV in addition to monitoring by government agencies.</li> </ul>
The revenue stream for SE-TP:SPV and viability analysis	<ul style="list-style-type: none"> <li>• The sustenance of the SE-TP:SPV is achieved tourist user fees and facility management charges to be levied on TKZC:SPV.</li> </ul>
Source of investment for TKZC:SPV	<ul style="list-style-type: none"> <li>• The phase I capital expenses are funded through a contribution from SE-TP:PIU, equity and term loan to be arranged by the PPP concessionaire. Apart from internal accrual from the operations of TKZC will be utilised for financing subsequent development phases.</li> </ul>
The scope of TKZC:SPV and mode of execution and O&M	<ul style="list-style-type: none"> <li>• The development and O&amp;M activities pertaining to TKZC are to be performed by TKZC – SPV under PPP mode selected through a transparent procurement process;</li> <li>• TKZC:SPV shall be responsible for all internal infrastructure and facility development and operation and shall comply with the terms of the concession agreement between SE-TP:PIU, SE-TP:SPV and TKZC:SPV; and</li> <li>• Major activity: TKZC development, including the necessary infotainment facilities within SE-TP, including financing and O&amp;M activities.</li> </ul>
The revenue stream for TKZC:SPV and viability analysis	<ul style="list-style-type: none"> <li>• Revenue from the developed facility of TKZC – leisure, entertainment, education, research, skill development, stay, food courts, tariff from tourists, vehicle parking; margins from food and beverages, souvenirs, and other tourism-related aspects;</li> <li>• Revenue from built-up space – research centre, commercial and social zones;</li> <li>• Revenue from facility management of knowledge centre zone and other facilities;</li> <li>• Income generation from operations of specialised tourism infrastructure facilities; and</li> <li>• Income generation from interest on deposits.</li> </ul>
The scope of other agencies	<ul style="list-style-type: none"> <li>• The respective occupant units of IRC-CoE&amp;IDC located within the knowledge centre zone shall establish and operate the units. The internal development, financing and O&amp;M activities within knowledge centre zone allotted area are to be performed by respective private companies/occupant units complying with the development control regulations of SE-TP, TKZC and knowledge centre zone.</li> </ul>
Specific exclusion from the scope of SE-TP:PIU, SE-TP:SPV	<ul style="list-style-type: none"> <li>• The investment, management and performance of TKZC:SPV and occupant units of IRC-CoE&amp;IDC located within the knowledge centre zone are out of the purview of SE-TP:PIU and SE-TP:SPV.</li> </ul>
Specific exclusion from the scope of TKZC:SPV	<ul style="list-style-type: none"> <li>• The investment, management and performance of occupant units of IRC located within the knowledge centre zone are out of the purview of TKZC:SPV.</li> </ul>

*Source: MACE analysis*



GoB shall provide irrespective of the development approach, the land for various development zones of SE-TP and the consideration for the same may vary from approach to approach. Adequate checks and balances ensure the envisaged end-use and value creation in the tourism sector.

The strategic partners shall subscribe to the equity stake in the TKZC:SPV and the concessionaire shall execute shareholders - development - marketing - operation agreement with the nodal agency namely SE-TP:PIU, SE-TP:SPV. The GoB may also consider participating in the equity of the TKZC:SPV, but this participation need not be a necessary condition or requirement. The necessary checks, balances, and instruments incorporated in the concession agreement ensure the performance of the concessionaire.

PPP in TKZC development context means a contractual arrangement between GoB/BEZA/government-owned entity on one side (SE-TP:PIU) and a private sector entity on the other, for the provision of developed infotainment facilities, and ready-built facilities for research activities. Apart from the infrastructure and facility creation, the intervention includes specialised tourism infrastructure. The private sector entity undertakes the investments and management for a specified period. The agreement specifies the clear allocation of risk between the private sector and GoB. The private entity receives performance-linked payments that conform (or benchmarked) to specified and pre-determined performance standards, measurable by the occupant units/end users of TKZC facilities and representatives of GoB. In the TKZC concession, a form of PPP, the GoB defines and grants specific rights to the private sector to build and operate the TKZC for a fixed period.

The consortium agreement shall delineate the roles and responsibilities of each of the consortium member, including the financial commitment to the TKZC:SPV.

## 15.2. Strategic partners/developers

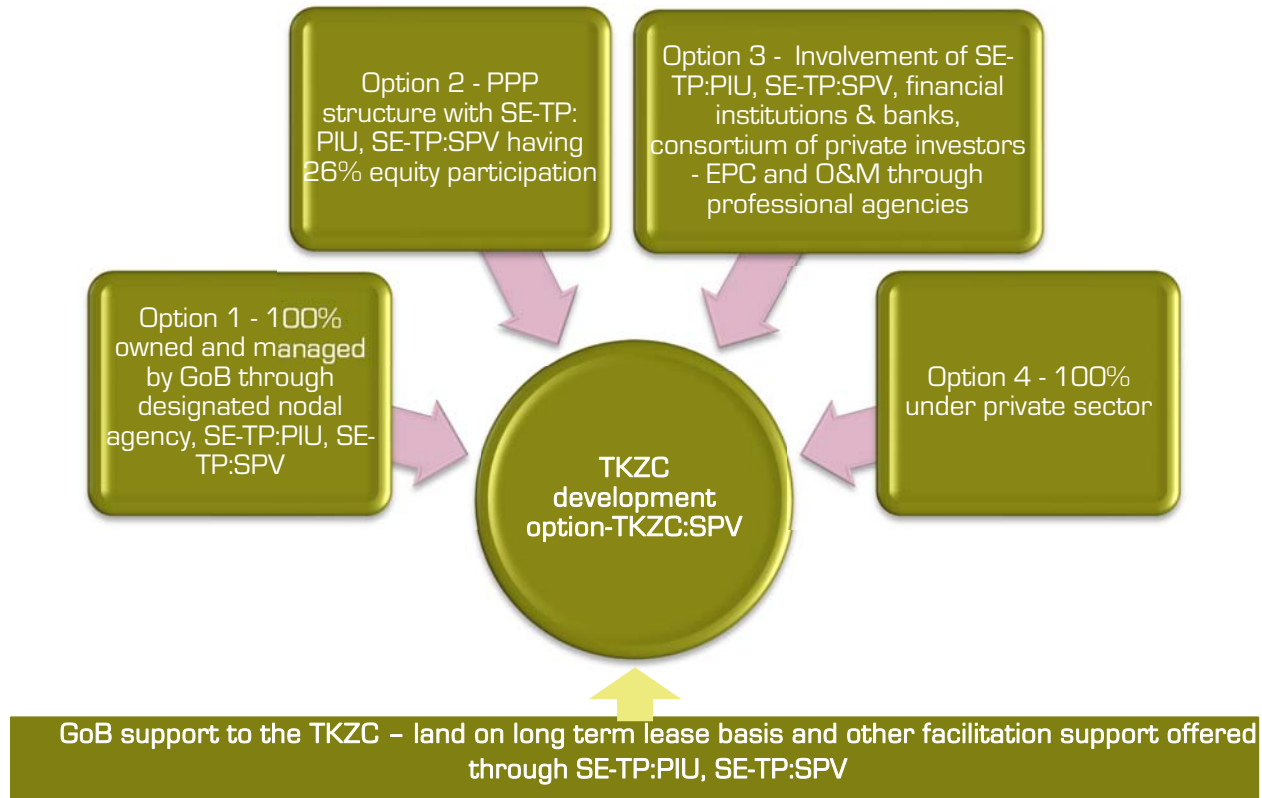
SE-TP:PIU shall induct strategic partners comprising of a consortium of developers having excellent exposure and a high record of accomplishment in the development and management of eco-tourism clusters/tourism entertainment and attraction facilities/tourism infotainment facilities/business zone management/high-ranking technology/education/research partner, international campus/institute developers, research and development centre, facility managers, hotel and clubhouse operators. The profile of the strategic partners would be in synergy with the requirements of developing and operating a standard class eco-tourism hub. It is also preferable to select a consortium having an anchor tenant for IRC-CoE&IDC to ensure the speedy implementation of the first phase and to amortise the initial cost of TKZC infrastructure. Alternatively, the project development model could also consider EPC and O&M approach.

### 15.2.1. TKZC development option and strategy

The various scenario options for the development of the TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries were studied and recommended after critical review and benchmarking of successful models of meaningful participation of the private sector.

**Exhibit No. 15.1** depicts various development options for the development of the TKZC.

The study includes analysis of the scenarios on the extent of participation from GoB, through SE-TP:PIU and involvement from the private sector, including roles and responsibilities in the development and operations of the proposed TKZC.



Source: MACE analysis

Strategic partners/developers selection process, project structuring and TKZC:SPV, governance & management structure, institutional arrangements, roles and responsibilities of various agencies involved in SE-TP and TKZC, activities of the SE-TP:PIU, SE-TP:SPV, TKZC:SPV, formation of various SPVs are discussed at length in **Annexure-15A**.

### 15.3. Strategic linkages

A fundamental requirement for sustainable SE-TP is for the various stakeholders to work effectively together in the planning and management of the SE-TP and the implementation of TKZC and activities. This should be based on the development of effective coordination and partnership structures, both at a GoB level and within local destinations.

The SE-TP shall focus on the strategic linkages with rural communities, farmers, tourism value chain actors and other institutes/organisation of repute in Bangladesh and abroad.

The SE-TP:PIU, SE-TP:SPV, and TKZC:SPV shall explore and enter into strategic alliances with leading international institutions/organisations to leverage global opportunities.

Well-conceived tourist-centric concepts and strategies will position SE-TP as a world-class tourism destination while conserving and protecting biodiversity, cultural values and national pride. SE-TP would essentially be a confluence of enabling infotainment and research nodes, the development of which would supplement and complement the core objectives of sustainable tourism sector development and green economy. The enabling infotainment nodes would cover a horizon of activities fundamentally of importance to propel the conceived development of the tourism and allied sector in the country besides fuelling the knowledge-based green economy. SE-TP is coined as a perfect blend of entertainment, education, information, and leaning meeting the diverse nature of tourist visitors across age groups, culture with vast and varied expectations. SE-TP offer a conducive

business environment for knowledge workers, research and innovation activities promoting a green knowledge-based economy.

The networking with the non-resident Bangladeshis is an important factor in the development of sciences, engineering and technology and hence mechanisms shall be devised to explore the vast resources of information, knowledge and even capital that lies with non-resident Bangladeshis.

The SE-TP:PIU, SE-TP:SPV, TKZC:SPV shall play the role of the project developer, infrastructure provider besides its significant role of business facilitator by efficiently providing linkage between tourism value chain actors, rural community, value addition and support business be it rural products and high-end research activities. SE-TP shall demonstrate its capability in accepting no limits in developing Bangladesh tourism markets through alternative thinking, best suiting to the requirements, setting its standards, benchmark and templates besides driving positive change. The initiative of promoting sustainable SE-TP is timely and in perfect congruence with vision 2041, Delta Plan and UN SDGs.

#### 15.4. Procurement, bidding document and negotiation procedures

The procurement, bidding documents and negotiation procedures shall be done as per the regulations laid by GoB and transparency and accountability shall be ensured in such process.

#### 15.5. Need for partnership with other countries

To improve the tourism sector and promote knowledge-based green economy in Bangladesh, it is necessary to adopt state of the art technologies, investments and modern management practices with due consideration to protect the interests of the rural communities, tourist, tourism value chain actors and private sector investor and research communities at large.

The success of eco-tourism projects requires a strong vision to conserve the environment, protecting cultural values while forging technology and smartness to improve the infotainment experience. Judicious use of technology, tailored appropriately for a specific location and product-specific interventions, will improve tourism value actor and rural community income and boost economic development in rural areas. The cutting-edge research on emerging areas requires a judicious blend of domestic knowledge, and international lessons learnt on the research topic.

Unlike other industrial sectors, to capture the high-end global market, three-way cooperation is considered as key for the tourism sector and research sector. An ideal combination, therefore, could include interested Bangladesh players + technology/state of the art tourism equipment/tourism service provider who could be strategic international partner + leading marketing and brand or organisation, who could market the SE-TP or products of the IRC-CoE&IDC, as depicted in the **Exhibit No. 15.2**.

Hence partnering with other countries is viewed as an important element to provide the missing links.



*Source: MACE analysis*

### 15.6. Need for a host of partnering countries

Having realised the need for partnership with other countries, it is suggested to have a host of partnering countries for taking forward this initiative. The rationale for involving a host of partnering countries is enumerated below:

Bangladesh, because of its unique ecosystem, offers distinctive ecotourism across the sub-sectors of tourism and SE-TP needs to accommodate foreign tourists/companies across the sub-sectors for harnessing the full potential.

It may not be appropriate to develop business strategies with technologies and market dependence on a particular country. As a prudent strategy, it is imperative for the SE-TP:PIU, SE-TP:SPV/TKZC developer to bring the best of know-how and technology across the globe for sustained development and also as a risk mitigation measure.

Also, as a well-conceived marketing strategy and to attract the occupant units of the IRC-CoE&IDC, it is justifiable to have a basket of technologies of varied applications and diverse market focus.

Huge investment outlay is being contemplated for the tourism and knowledge-based green economy sector and this call for participation of many players across the globe. In order to improve the unit value realisation of the produce, new/untapped/alternate market entry strategies need to be devised besides addressing huge foreign tourists/export markets.

By providing a wide basket of globally competitive technologies and marketing channels for a given project, the Bangladesh player (occupant units of IRC-CoE&IDC) can select a technology of its choice and select the target market, and devise strategies for successful partnering.

Partnerships with certain countries are considered important from the viewpoint of cutting-edge technologies and state of the art research activities on some of the promising areas. Certain countries possess technology for high-end equipment and machinery. On the other hand, there are countries, which are considered important from the viewpoint of export markets for produce from SE-TP occupant units of IRC-CoE&IDC. Further, there are few countries where the regional conditions are not favourable for tourism, agriculture and allied sectors production. Hence, exclusives zones can be identified for these countries to facilitate the investment and marketing of the produce besides promoting themed tourism.

### 15.7. Likely partnering countries

Considering the multi-dimensional issues, it is suggested that the proposed SE-TP have the benefit of partnerships with many countries.

The selection of countries is based on criteria such as large presence in eco-tourism/large TAF/research in emerging areas, dominance in terms of technology, equipment's, cluster development, markets, technology, the location as a market-hub, presence of large relevant consumer market, possibility of creating dedicated zones, past interest in Bangladesh market and recent developments.

### 15.8. MoUs with potential partners and countries

Being the nodal agency, SE-TP:PIU, SE-TP:SPV activities shall encompass the following apart from other activities described areas:

- Identifying project opportunities and facilitating investment in SE-TP;
- Conducting investors meets roadshows, etc.;
- Appointment of agencies and experts for facilitating investment promotion;
- Periodical follows up of investment queries, the conclusion of MoUs, definitive agreements, etc.'
- Selection of developers for the establishment of TKZC'
- Acts as a single-window for all the clearances;
- Record the progress of investments and reporting; and
- Conduct such other activities to realise the vision of the policy.

SE-TP:PIU, SE-TP -SPV shall explore and enter into strategic alliances with leading international institutions/organisations in order to leverage global opportunities.

SE-TP:PIU, SE-TP:SPV shall endeavour to bring state of the art technologies & equipment's, promote cutting-edge research and education collaborations and initiate tie-ups with global marketing channels apart from bringing investments to the proposed SE-TP in Bangladesh.

Towards this, SE-TP:PIU, SE-TP:SPV shall intend to promote collaborations by entering into facilitation agreements with various players through the signing of MoUs.

Table No. 15.4: Model MoUs

MoU No.	Parties	Purpose
MoU – I	SE-TP:PIU, SE-TP:SPV and resource providers	For facilitating international collaborations
MoU – II	SE-TP:PIU, SE-TP:SPV and international investors	For facilitating international investments
MoU – III	SE-TP:PIU, SE-TP:SPV and research and innovation partners	For facilitating international collaborations and promoting research
MoU – IV	SE-TP:PIU, SE-TP:SPV and product marketing support providers/tourist facilitation	For facilitating international collaborations/tourism promotion as applicable

MoU No.	Parties	Purpose
MoU – V	SE-TP:PIU, SE-TP:SPV and domestic investors	For facilitating domestic investments
MoU – VI	SE-TP:PIU, SE-TP:SPV and financial institutions & banks	For facilitating finance to the tourism sector and research and incubation activities.

*Source: MACE analysis*

### 15.9. Opportunities for private sector participation in developing tourism components, infrastructure and research infrastructure

The areas of private sector involvement could be categorised under 3 broad segments viz. sustainable infrastructure to facilitate tourist within identified infotainment zones of SE-TP, development of individual tourism components within identified infotainment zones of SE-TP and establishment of research and innovation centre in knowledge centre zone.

In the hotel and tourism industry, the dominance of the private sector should be encouraged. In tourism, travel agencies play a vital role. The following areas in the tourism sector have been identified for direct participation by the private sector:

- Developing tourist's accommodation;
- Organizing cultural programs/events and performances;
- Unconventional power generation, particularly solar and wind energy;
- Tours and travel services;
- Package tours;
- Tour guides;
- Maintenance of heritage and historical monuments;
- Maintenance of places of scenic beauty;
- Organizing light and sound shows; and
- Policing.

### 15.10. Standards, quality control recommendations

It is imperative to improve the overall quality of products and services within the tourism industry (all tourism-related accommodation, restaurants, tour guides, tour operators, and

other tourism-related service providers); raise the levels of demand nationally, regionally and internationally; promote competitiveness within the industry; and, provide valuable and reliable information on quality standards for the tourist and the travel industry.

Necessary instruments such as planning controls using ICT applications, E&S impact assessment, certification and financial incentives should be used to increase sustainability in both the development and the operation of SE-TP, taking account of international experience, standards and conventions. In turn, this requires effective measurement and monitoring of the impacts of operations of SE-TP:PIU, SE-TP:SPV and TKZC:SPV through the use of appropriate context-specific indicators.

The development of a dynamic and competitive tourism sector need standardised process and products. The expectations, standards and assurance systems for basic quality and safety increasingly are becoming similar for national, regional and global markets. There is, therefore, a need to develop and build capacity relating to tourism standards that are responsive to domestic and foreign tourist needs and, as needed, comply with international requirements and standards.

Sustainable tourism for development guidelines of UNWTO, indicators of sustainable development for tourism destinations developed by UNWTO, Policies, Strategies and Tools for the Sustainable Development of Tourism issued by UNWTO shall be taken into consideration. Further, the GSTC criteria for destinations and hotels (tour operators) also shall be taken into consideration.

ISO standards mentioned in **Table No. 15.5** shall be adhered by SE-TP in its development and operation apart from the environment and local regulations.

Table No. 15.5: Global ISO standards

ISO number	Description
ISO 11107:2009	Recreational diving services – Requirements for training programmes on enriched air nitrox (EAN) diving
ISO 11121:2009	Recreational diving services – Requirements for introductory training programmes to scuba diving
ISO 11121:2017	Recreational diving services – Requirements for introductory programmes to scuba diving
ISO 13009:2015	Tourism and related services – Requirements and recommendations for beach operation
ISO 13289:2011	Recreational diving services – Requirements for the conduct of snorkelling excursions
ISO 13293:2012	Recreational diving services – Requirements for gas blender training programmes
ISO 13687-1:2017	Tourism and related services – Yacht harbours – Part 1: Minimum requirements for basic service level harbours
ISO 13687-2:2017	Tourism and related services – Yacht harbours – Part 2: Minimum requirements for intermediate service level harbours
ISO 13687-3:2017	Tourism and related services – Yacht harbours – Part 3: Minimum requirements for high service level harbours
ISO 13687:2014	Tourism and related services – Yacht harbours – Minimum requirements
ISO 13810:2015	Tourism services – Industrial tourism – Service provision
ISO/TS 13811:2015	Tourism and related services – Guidelines on developing environmental specifications for accommodation establishments
ISO 13970:2011	Recreational diving services – Requirements for the training of recreational snorkelling guides
ISO 14785:2014	Tourist information offices – Tourist information and reception services – Requirements
ISO 17679:2016	Tourism and related services – Wellness spa – Service requirements
ISO 17680:2015	Tourism and related services – Thalassotherapy – Service requirements
ISO 18065:2015	Tourism and related services – Tourist services for public use provided by Natural Protected Areas Authorities – Requirements
ISO 18513:2003	Tourism services – Hotels and other types of tourism accommodation – Terminology
ISO/CD 18513	Tourism services – Hotels and other types of tourism accommodation – Terminology
ISO 20410:2017	Tourism and related services – Bareboat charter – Minimum service and equipment requirements
ISO 20611:2018	Adventure tourism – Good practices for sustainability – Requirements and recommendations
ISO 21101:2014	Adventure tourism – Safety management systems – Requirements
ISO/DIS 21102	Adventure – Leaders – Personnel competence
ISO/TR 21102:2013	Adventure tourism – Leaders – Personnel competence
ISO 21103:2014	Adventure tourism – Information for participants
ISO 21401:2018	Tourism and related services – Sustainability management system for accommodation establishments – Requirements
ISO/FDIS 21406	Tourism and related services – Yacht harbours – Essential requirements for luxury harbours
ISO 21416:2019	Recreational diving services – Requirements and guidance on environmentally sustainable practices in recreational diving

ISO number	Description
ISO 21417:2019	Recreational diving services – Requirements for training on environmental awareness for recreational divers
ISO 21426:2018	Tourism and related services – Medical spas – Service requirements
ISO/WD 21620	Tourism and related services- Heritage Hotels
ISO/AWI 21621	Traditional restaurants – Visual aspects, decoration and services
ISO/DIS 21902	Tourism and related services – Accessible tourism for all – Requirements and recommendations
ISO/FDIS 22483	Tourism and related services – Hotels – Service requirements
ISO/DIS 22525	Tourism and related services – Medical tourism – Service requirements
ISO/DIS 22876	Tourism and related services – Bareboat charter – Supplementary charter services and experiences
ISO/AWI 23405	Tourism and related services – Principles and terminology of sustainable tourism
ISO/AWI 24063	Requirements for rebreather diver training – Non-decompression diving
ISO/WD 24642	Recreational diving services – Requirements for rebreather diver training – Decompression diving to 45 m
ISO 24801-1:2007	Recreational diving services – Safety related minimum requirements for the training of recreational scuba divers – Part 1: Level 1 – Supervised diver
ISO 24801-1:2014	Recreational diving services – Requirements for the training of recreational scuba divers – Part 1: Level 1 – Supervised diver
ISO 24801-2:2007	Recreational diving services – Safety related minimum requirements for the training of recreational scuba divers – Part 2: Level 2 – Autonomous diver
ISO 24801-2:2014	Recreational diving services – Requirements for the training of recreational scuba divers – Part 2: Level 2 – Autonomous diver
ISO 24801-3:2007	Recreational diving services – Safety related minimum requirements for the training of recreational scuba divers – Part 3: Level 3 – Dive leader
ISO 24801-3:2014	Recreational diving services – Requirements for the training of recreational scuba divers – Part 3: Level 3 – Dive leader
ISO 24802-1:2007	Recreational diving services – Safety related minimum requirements for the training of scuba instructors – Part 1: Level 1
ISO 24802-1:2014	Recreational diving services – Requirements for the training of scuba instructors – Part 1: Level 1
ISO 24802-2:2007	Recreational diving services – Safety related minimum requirements for the training of scuba instructors – Part 2: Level 2
ISO 24802-2:2014	Recreational diving services – Requirements for the training of scuba instructors – Part 2: Level 2
ISO 24803:2007	Recreational diving services – Requirements for recreational scuba diving service providers
ISO 24803:2017	Recreational diving services – Requirements for recreational diving providers

*Source: MACE analysis*

The SE-TP:PIU, SE-TP:SPV, TKZC:SPV shall enforce stringent procedure and practices apart from the statutory and compliance stipulation requirements.

#### 15.11. Sustainable Business Model Canvas for SE-TP –PIU, SE-TP –SPV

The Sustainable Business Model Canvas (SBMC) tool builds on and expands the business model canvas proposed by Alexander Osterwalder and Yves Pigneur. The add-ons explicitly address costs and benefits for society



and the environment. **Table No. 15.6** details the SBMC (adopted from Sempels<sup>33</sup>) structured around 13 building blocks, migrating from the traditional approach of the bottom line (financial profits) to the triple bottom line (planet, people, and profit) approach. Traditionally the business model canvas focuses exclusively on the company's bottom line and in the SBMC;

approach broadens to frame the value creation by looking beyond just the financial value, to integrate the environmental and social value. Acknowledging the active principle of construction and interdependence that characterises the business model elements, the model establishes the powerful synergies among the environmental, social and financial performances.

**Table No. 15.6: Blocks of sustainable business model canvas**

Costs for society and the environment	Key partners	Key activities	Sustainable value proposition	Customer relationship management	Customer segments	Benefits for society and the environment
		Key resources		Distribution channels		
Shared Costs	Cost structure		Revenue streams			Shared benefits

*Source: MACE analysis*

The four building blocks incorporate the sustainability checks of SE-TP:PIU, SE-TP:SPV: cost for society and environment; shared costs / sustainable cost; benefits for society and environment; and core shared value-creation opportunity / shared benefits. These four additional blocks relate to positive and negative social and environmental externalities SE-TP:PIU, SE-TP:SPV generate. These externalities refer to situations when the effect of SE-TP:PIU, SE-TP:SPV operation imposes costs or benefits on others. The prices charged for the services

provided by SE-TP:PIU, SE-TP:SPV, do not reflect these externalities.

A central tenet underlies the comprehension and use of the SBMC: its systemic and interdependent character. Because of the reason that the 13 blocks eminently relate to each other, any modification in one block induces effects on others.

**Annexure-15A** provides the detailed considerations involved in building SBMC.

<sup>33</sup> Sempels, C. and Hoffmann, J. (2013), Sustainable Innovation Strategy: Creating Value in a World of Finite Resources, Palgrave Macmillan, London

## Chapter - 16

# Governance, management structure and policy framework

### 16.1. Governance & management structure of SE-TP including IRC-CoE&IDC

SE-TP:PIU created within BEZA shall be the implementing agency for SE-TP. The subsequent O&M of SE-TP shall be under the control of SE-TP:SPV.

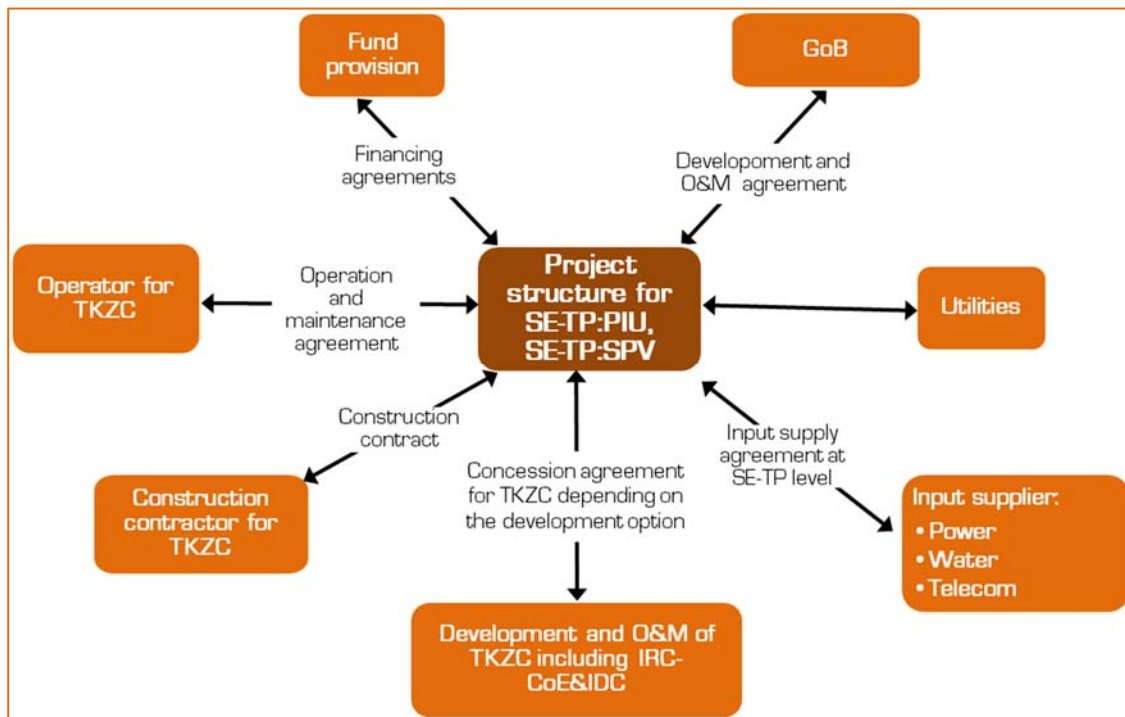
SE-TP:SPV, TKZC:SPV shall be a body corporate, a company incorporated under with the Bangladesh Companies Act 1994 and in accordance with the procedures of Registrar of Joint Stock Companies and Firms (RJSC), the Company House of Bangladesh. As per the Companies Act 1994, there are mainly three types of companies: Company limited by shares,

Company limited by guarantee; and Company with unlimited liability. Further SE-TP:SPV and TKZC:SPV shall comply with relevant statutory authorities of Bangladesh.

SE-TP:PIU, SE-TP:SPV and TKZC:SPV shall have several legal and contractual agreements towards concession, financing, marketing, availing external connectivity, marketing of TAF, marketing of space of IRC, and O&M.

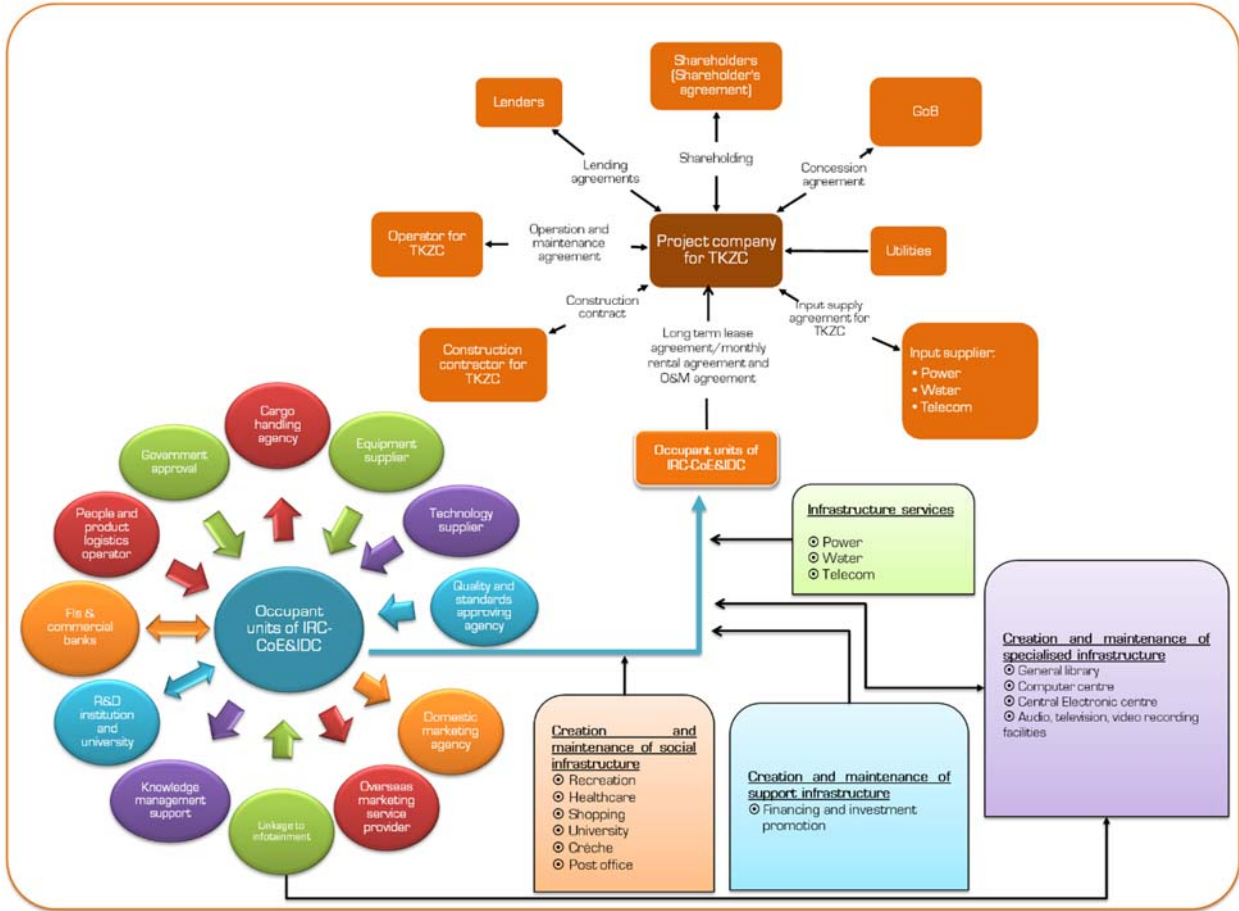
Exhibit No. 16.1 & 16.2 and Table No. 16.1 & 16.2, show the contractual structure and legal framework of SE-TP:PIU, SE-TP:SPV and TKZC:SPV.

Exhibit No. 16.1: Contractual structure of SE-TP:PIU and SE-TP:SPV



Source: MACE analysis

Exhibit No. 16.2: Contractual structure of TKZC:SPV



Source: MACE analysis

Table No. 16.1: Legal framework for SE-TP:PIU and SE-TP:SPV

Infotainment zones development by SE-TP:PIU	
Infotainment zones development by SE-TP:PIU	<ul style="list-style-type: none"> <li>SE-TP:PIU shall develop TAF and specialised tourism infrastructure (other than those developed by TKZC:SPV).</li> </ul>
Infotainment zones O&M by SE-TP:SPV	
Infotainment zones O&M by SE-TP:SPV	<ul style="list-style-type: none"> <li>SE-TP:SPV shall perform O&amp;M of TAF and specialised tourism infrastructure (other than those developed and operated by TKZC:SPV to the stipulated standards and shall provide services as per the pre-agreed levels to the designated nodes;</li> <li>The ownership of the TAF and specialised tourism infrastructure (other than those developed and operated by TKZC:SPV shall continue to rest with the SE-TP:PIU;</li> <li>The tenure of the O&amp;M Agreement shall be for ten years;</li> <li>Also, the agreement shall have an automatic clause for an extension;</li> <li>The tourists shall avail the TAF and specialised tourism infrastructure (other than those developed and operated by TKZC:SPV common infrastructure facilities created by SE-TP:PIU for a consideration;</li> </ul>

	<ul style="list-style-type: none"> <li>o Legal document – O&amp;M agreement stipulating terms and conditions of: <ul style="list-style-type: none"> <li>a. Utility usage;</li> <li>b. Eco-conservation, E&amp;S compliance and discharge standards, and safety compliance;</li> <li>c. Service levels of various infrastructure facilities;</li> <li>d. Adherence to SE-TP development control regulations and acts</li> <li>e. Compliance with timelines for repair and refurbishment</li> <li>f. Clauses to protect visitors and occupant unit interest in SE-TP</li> <li>g. Clauses to protect the SE-TP:PIU, SE-TP:SPV interest;</li> <li>h. Clauses to ensure sustained delivery of services by the SE-TP:SPV</li> </ul> </li> </ul>
<b>Input service providers to SE-TP:PIU, SE-TP:SPV</b>	
Power and water	<ul style="list-style-type: none"> <li>o SE-TP:PIU, SE-TP:SPV shall enter a long-term arrangement with designated agencies for bulk availing of power and water that in turn shall provide these utilities to the various development zones of SE-TP;</li> <li>o Legal document - Service provider agreement stipulating terms and conditions of: <ul style="list-style-type: none"> <li>a. Quantity and phasing;</li> <li>b. Service levels;</li> <li>c. Compliance with timelines for feeder lines;</li> <li>d. Terms and conditions for utility providing and amortising the cost of feeder lines;</li> <li>e. Clauses to protect the SE-TP:PIU, and SE-TP:SPV; and</li> <li>f. Clauses to protect utility provider interest</li> </ul> </li> </ul>

*Source: MACE analysis*

**Table No. 16.2: Legal framework for SE-TP:PIU, SE-TP:SPV and TKZC:SPV**

<b>Agreement between SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>	
Land lease, development and O&M	<ul style="list-style-type: none"> <li>o SE-TP:PIU shall enter a land lease agreement, development and O&amp;M agreement stipulating the conditions of the land lease, tenure, end-use purpose, compliance to SE-TP guidelines, development conditions, specifications and O&amp;M conditions and other terms and conditions ensuring fair and transparent business practices;</li> <li>o The land lease agreement and development agreement shall be entered between SE-TP:PIU and TKZC:SPV;</li> <li>o The O&amp;M agreement shall be entered between SE-TP:SPV and TKZC:SPV; and</li> <li>o The land sublease agreement shall be entered between TKZC:SPV and individual private companies of IRC.</li> </ul>
<b>Development of TKZC including IRC</b>	
TAF in the infotainment zones development and O&M	<ul style="list-style-type: none"> <li>o TKZC:SPV shall provide TAF and specialised tourism infrastructure to the visitors of SE-TP by the pre-defined configuration on a long-term leasehold and short-term lease basis;</li> <li>o TKZC:SPV shall own &amp; maintain the TAF, specialised tourism infrastructure and ensure uninterrupted and reliable delivery of services;</li> <li>o TKZC:SPV shall operate and maintain the TAF and specialised tourism infrastructure to the stipulated standards and shall provide services as per the pre-agreed levels to the requirement of visitors TKZC as appropriate to the respective SPV;</li> <li>o The tenure of the lease shall be by GoB (SE-TP:PIU, SE-TP:SPV) stipulations;</li> <li>o The visitors of SE-TP shall avail the TAF and specialised tourism infrastructure facilities created by TKZC:SPV for a consideration;</li> <li>o The ownership of the TAF and specialised tourism infrastructure shall continue to rest with the TKZC:SPV;</li> </ul>

	<ul style="list-style-type: none"> <li>o The tenure of the O&amp;M agreement shall be for 10 years;</li> <li>o Also, the agreement shall have an automatic clause for an extension;</li> <li>o Legal document – long-term leasehold and short-term lease agreement and O&amp;M agreement stipulating terms and conditions of: <ul style="list-style-type: none"> <li>a) Usage regulations and occupancy;</li> <li>b) Utility usage;</li> <li>c) Eco-conservation, E&amp;S compliance and discharge standards and compliance with safety standards;</li> <li>d) Adherence to SE-TP and TKZC development control regulations and acts;</li> <li>e) Compliance with timelines for the establishment of TAF and specialised tourism infrastructure;</li> <li>f) Lease terms and conditions;</li> <li>g) Adherence to the conditions of the O&amp;M agreement between SE-TP:SPV and TKZC:SPV;</li> <li>h) Service levels of various infrastructure facilities</li> <li>i) Compliance with timelines for repair and refurbishment</li> <li>j) Clauses to protect visitor interest in TKZC;</li> <li>k) Clauses to protect the TKZC:SPV interest; and</li> <li>l) Clauses to ensure sustained delivery of services by the TKZC:SPV.</li> </ul> </li> </ul>
<p>IRC by development and O&amp;M by TKZC:SPV</p>	<ul style="list-style-type: none"> <li>o TKZC:SPV shall provide IRC to the occupant units of IRC-CoE&amp;IDC by the pre-defined configuration on a long-term leasehold and short-term lease basis;</li> <li>o TKZC:SPV shall own &amp; maintain the IRC-CoE&amp;IDC and ensure uninterrupted and reliable delivery of services;</li> <li>o The tenure of the lease shall be by GoB (SE-TP:PIU, SE-TP:SPV) stipulations;</li> <li>o The occupant unit of IRC-CoE&amp;IDC shall avail the common facilities created by TKZC:SPV for a consideration;</li> <li>o The ownership of the IRC-CoE&amp;IDC shall continue to rest with the TKZC:SPV;</li> <li>o TKZC:SPV shall operate and maintain the IRC-CoE&amp;IDC to the stipulated standards and shall provide services as per the pre-agreed levels to the occupant units of the respective hub;</li> <li>o The tenure of the O&amp;M agreement shall be for 10 years;</li> <li>o Also, the agreement shall have an automatic clause for an extension;</li> <li>o Legal document – long-term leasehold and short-term lease agreement and O&amp;M agreement stipulating terms and conditions of: <ul style="list-style-type: none"> <li>a. Usage regulations and occupancy;</li> <li>b. IRC-CoE&amp;IDC usage;</li> <li>c. Eco-conservation, E&amp;S compliance and discharge standards and compliance with safety standards;</li> <li>d. Adherence to SE-TP and TKZC development control regulations and acts;</li> <li>e. Compliance with timelines for the establishment of IRC;</li> <li>f. Lease terms and conditions;</li> <li>g. Adherence to the conditions of the O&amp;M agreement between SE-TP:SPV and TKZC:SPV;</li> <li>h. Service levels of various infrastructure facilities;</li> <li>i. Compliance with timelines for repair and refurbishment;</li> <li>j. Clauses to protect occupant unit interest in IRC;</li> <li>k. Clauses to protect the TKZC:SPV interest; and</li> <li>l. Clauses to ensure sustained delivery of services by the TKZC:SPV.</li> </ul> </li> </ul>
<p>Occupant units of ready-built IRC space of TKZC</p>	<ul style="list-style-type: none"> <li>o TKZC:SPV shall allocate ready-built space to the occupant unit of TKZC as appropriate for the pre-defined innovation and research activities on a long-term leasehold or short-term lease basis or monthly lease rental basis;</li> </ul>

	<ul style="list-style-type: none"> <li>o The land possession shall continue to rest with the SE-TP:PIU/TKZC:SPV, and the producer unit shall establish the innovation and research unit in TKZC as per the development control regulations;</li> <li>o The tenure of the lease shall be by GoB (SE-TP:PIU, SE-TP:SPV) and TKZC:SPV stipulations;</li> <li>o The tenure of the rental agreement shall be for three years in the stretch (yearly lease) or 11 months (monthly lease) with options for an extension on mutually acceptable terms;</li> <li>o The occupant unit shall avail the common infrastructure facilities created by TKZC:SPV as appropriate for consideration.</li> <li>o Legal document – long-term leasehold and short-term lease agreement yearly lease and monthly lease rental agreement stipulating terms and conditions of: <ul style="list-style-type: none"> <li>a. Built-up space and location;</li> <li>b. Designated IRC usage and production capacity;</li> <li>c. Environment compliance and discharge standards;</li> <li>d. Adherence to TKZC development control regulations and acts;</li> <li>e. Compliance with timelines for the establishment of units/ functional offices;</li> <li>f. Lease terms and conditions including aspects of subletting or creating on charge or lien on the leased property;</li> <li>g. Rental terms and conditions including aspects of subletting or creating on charge or lien on the leased property;</li> <li>h. Clauses to protect occupant unit interest in TKZC;</li> <li>i. Clauses to protect TKZC:SPV;</li> <li>j. Clauses to ensure sustained delivery of services by the TKZC:SPV;</li> </ul> </li> </ul>
<b>Input service providers to SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>	
Power and water	<ul style="list-style-type: none"> <li>o SE-TP:PIU, SE-TP:SPV shall enter a long-term arrangement with designated agencies for bulk availing of power and water that in turn shall provide these utilities to the various development zones of SE-TP;</li> <li>o TKZC:SPV shall avail the utilities at pre-defined levels of usage;</li> <li>o Further, TKZC:SPV shall provide these facilities to the visitors and occupant units of TKZC;</li> <li>o SE-TP:PIU shall own the assets created by the SE-TP:PIU within the boundaries of SE-TP;</li> <li>o Similarly, TKZC:SPV shall own the assets created by TKZC:SPV within the boundaries of TKZC;</li> <li>o Thus, the utilities up to the battery limits shall be the responsibility of designated agencies;</li> <li>o Legal document - service provider agreement stipulating terms and conditions of: <ul style="list-style-type: none"> <li>g. Quantity and phasing;</li> <li>h. Service levels;</li> <li>i. Compliance with timelines for feeder lines;</li> <li>j. Terms and conditions for utility providing and amortising the cost of feeder lines;</li> <li>k. Clauses to protect the SE-TP:PIU, SE-TP:SPV and TKZC:SPV interest;</li> <li>l. Clauses to protect utility provider interest; and</li> <li>m. Clauses to ensure sustained delivery of services by the service provider.</li> </ul> </li> </ul>

*Source: MACE analysis*

## 16.2. Institutional arrangements, roles and responsibilities of various agencies involved in SE-TP

**Exhibit No. 16.3** depicts the role and responsibilities of SE-TP:PIU, SE-TP:SPV, GoB and other agencies. The role of SE-TP:PIU, SE-TP:SPV is not just limited to the development and management of sustainable tourism cluster and knowledge-based green economy hub, but the SE-TP:PIU, SE-TP:SPV need to play an important role of business facilitator to the occupant units.

For providing overall guidance for planning and to ensure that the necessary policy and related administrative issues are addressed in a timely transparent manner adhering to the agreed and defined framework, SE-TP Apex/Steering Authority shall be constituted by GoB.

The broad role of the SE-TP Apex/Steering Authority would include:

- Ensuring that the project is well embedded and relevant in the national context and linked to opportunities outside the SE-TP
- Guidance to District Level Nodal Agency in SE-TP development and supporting zones
- Advice policy and decision-makers in the public and private sector on:
  - The SE-TP development requirements
  - Implementation of lessons learnt for the benefit and out scaling of eco-tourism clusters in Bangladesh and not limited to SE-TP
- The relevant sectors are represented at SE-TP, Apex/Steering Authority:
  - Government through various ministerial departments
  - Agencies for public infrastructure and services
  - Tourism sector (operators, resorts, hotels, agro tourism, rural tourism, inputs, equipment and infrastructure suppliers and service providers, transporters, traders, financial service providers, information and communication providers)

- Rural community

SE-TP:PIU shall perform the role of implementing agency for the SE-TP Apex/Steering committee. This SE-TP:PIU shall coordinate the execution of various activities towards the development of the SE-TP in a time-bound manner under the overall guidance of the SE-TP Apex/Steering Authority.

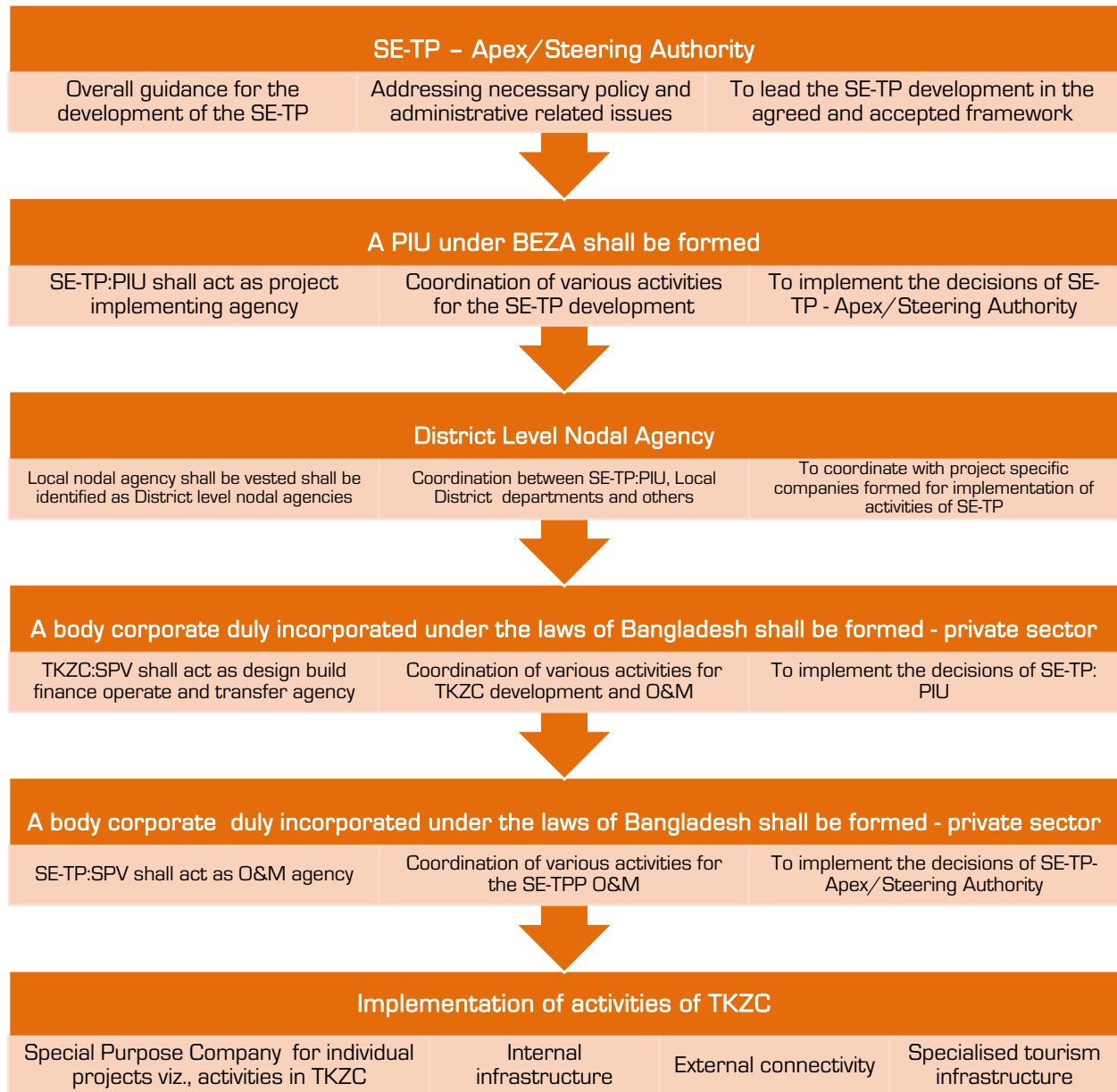
Further, it is suggested that a body corporate duly incorporated under the laws of Bangladesh shall be formed for O&M of SE-TP. This SE-TP:SPV shall perform the role of implementing agency for the SE-TP Apex/Steering committee in the context of O&M. This SE-TP -SPV shall coordinate the execution of various activities towards O&M of SE-TP in delivering time-bound quality services under the overall guidance of the SE-TP Apex/Steering Authority.

Apart from this, the District Authority shall identify a District Level Nodal Agency. The primary function of this District Level Nodal Agency is to coordinate between the SE-TP:PIU, SE-TP:SPV and District Government departments/entities and other project implementing agencies/special purpose companies for the implementation of activities of SE-TP and TKZC.

The constitution of District Level Nodal Agency would include:

- Relevant government ministries or departments
- Small and medium scale rural tourism products and service offeror
- Private large-medium and small-scale investors with business in or related to the SE-TP and IRC
- SE-TP key stakeholders
- Tourist organisations
- Public service providers
- Eco-conservation and bio-diversity protection agencies

Also, it is suggested that various special purpose companies for the development and operation of project activities in SE-TP/TKZC shall be formed to implement them under PPP mode.



Source: MACE analysis

**16.3. Institutional arrangements, roles and responsibilities of various agencies involved in TKZC**

Exhibit No. 16.4 & 16.5 depicts the role and responsibilities of TKZC concessionaire, SE-TP:PIU, SE-TP:SPV, TKZC:SPV and other

government monitoring agencies like GoB. Again, the role of TKZC:SPV is not just limited to development and management of TKZC, but the TKZC:SPV need to play an important role of business facilitator to the occupant units of TKZC, more specifically occupant units of IRC.



## Exhibit No. 16.4: Activities and responsibilities between SE-TP:PIU, SE-TP:SPV and TKZC:SPV

## SE-TP:PIU

- Contribution to the project capital investment in accordance with the selected option (if required so);
- External infrastructure linkages and connectivity road connectivity, highway strengthening, external water supply source linkages;
- Project clearance and facilitation support;
- Monitoring the performance of the private partner and enforcing the terms of the contract during implementation; and
- Other facilitation.

## SE-TP:SPV

- Monitoring the performance of the private partner and enforcing the terms of the contract in coordination with government agencies.

## Concessionaire

- Meeting the majority of project capital investment in accordance with the selected option;
- Delivering expertise in economic, management, operations, social, environment and innovation to run the project efficiently;
- Responsible for carrying out or operating the project; and
- Taking significant portion of the associated project risks.

## TKZC:SPV

- Formation of SPV/operation through existing entity;
- Design and engineering;
- Achieving financial closure;
- Statutory approval;
- Development of general, specialised and specific infrastructure;
- Marketing of TAF, IRC, ready built space, commercial and supporting elements space; and
- O&M.

Source: MACE analysis

## Exhibit No. 16.5: TKZC roles and linkages

Eco-Tourism cluster	Land	Infrastructure	Role of TKZC: SPV	Investment	Linkages
<ul style="list-style-type: none"> <li>• Large scale</li> <li>• Whole family infotainment</li> <li>• Blend of leisure, entertainment, education, skill development IRC</li> </ul>	<ul style="list-style-type: none"> <li>• SE-TP:PIU - allotment of land</li> <li>• SE-TP - contiguous</li> <li>• Eco-conservation</li> <li>• Protection of natural features, biodiversity</li> <li>• Ensure threshold level cluster size</li> </ul>	<ul style="list-style-type: none"> <li>• Internal – TKZC:SPV</li> <li>• External – SE-TP:PIU, GoB and other third parties</li> <li>• Specialised – TKZC:SPV</li> </ul>	<ul style="list-style-type: none"> <li>• Development</li> <li>• Marketing of tourist attraction facilities</li> <li>• Marketing of the multi formatted model for IRC</li> <li>• Business support to the occupant units</li> <li>• Operation of common services</li> <li>• Operation of tourist specialised services</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure investment – internal, specialised and specific services</li> <li>• Industrial investment – occupant units</li> </ul>	<ul style="list-style-type: none"> <li>• Tour operators</li> <li>• Marketing of tourist attraction facilities and built space</li> <li>• Branding</li> </ul>

Source: MACE analysis

#### 16.4. Activities of the SE-TP:PIU, SE-TP:SPV

Table No. 16.3 outlines the activities of the SE-TP:PIU and SE-TP:SPV.

Table No. 16.3: Activities of SE-TP:PIU and SE-TP:SPV

Implementation activities – one time (SE-TP:PIU)	Post-implementation activities – on-going (SE-TP:SPV)
<ul style="list-style-type: none"> <li>• Project development elements finalisation and technology/university/research institution tie-up (as applicable) finalisation</li> <li>• Land acquisition - GoB to facilitate the process</li> <li>• Statutory approvals, ESIA approval and follow up</li> <li>• Topography and contour survey of SE-TP common area</li> <li>• Geotechnical investigation of SE-TP common area</li> <li>• Finalisation of external water supply source, arrangement for external water supply, power supply and distribution (GoB to provide through its designated agencies as per applicable policies and regulations)</li> <li>• The arrangement of telecommunication facilities through external sources (GoB to coordinate)</li> <li>• Finalising development guidelines and control regulations</li> <li>• Master planning of SE-TP common area demarcation of TKZC</li> <li>• Raise, equity, loans and grant to commission SE-TP</li> <li>• Financial closure</li> <li>• Establishment of project development elements under the purview of SE-TP:PIU</li> <li>• Establishment of general infrastructure facilities and supporting infrastructure facilities like an embankment, internal pathways, site grading, drainage system, water treatment and water supply, sewerage network, and sewage treatment plant. Also, it includes solid waste management, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities</li> <li>• SE-TP TAF other than those specifically undertaken by TKZC:SPV</li> <li>• Subzones development – tourism and business</li> <li>• Administration zone</li> <li>• Multi-facility complex, amenities, utilities</li> <li>• Contractual agreement(s) with occupant units on a block framework level – TKZC:SPV</li> </ul>	<ul style="list-style-type: none"> <li>• Marketing of the TAF</li> <li>• Marketing of select activities related to the tourism sector in the capacity of facilitator and not in the capacity of tourism operator</li> <li>• Day to day operation of SE-TP common area and overall administration</li> <li>• Day to day operation of SE-TP TAF other than those specifically undertaken by TKZC:SPV</li> <li>• Phased development of the SE-TP common area</li> <li>• Ensuring efficient operations of all general infrastructure facilities</li> <li>• Facility management and maintenance of SE-TP common area</li> <li>• Enforcement of development regulations</li> <li>• Up-gradation of the facilities meeting the changing requirements and needs</li> <li>• Collection of maintenance revenue</li> <li>• Brand image building of the development zone</li> <li>• Maintenance of the general infrastructure</li> <li>• Maintenance of the environmental infrastructure and compliance with various standards and requirements</li> <li>• Facilitate the formation and/or strengthening of tourism/tourist associations</li> <li>• Facilitate rural and tribal tourism</li> <li>• Promote agro-tourism and develop a framework for an inclusive development model</li> <li>• Set up and run user-friendly ICT-based tourist information platform</li> <li>• Observing birthdays of eminent personalities related to the development of science, technology, engineering, education, human development, environment, innovation and social development, tourism</li> </ul>

Implementation activities – one time (SE-TP:PIU)	Post-implementation activities – on-going (SE-TP:SPV)
<ul style="list-style-type: none"> <li>Contractual agreement(s) for other institutional area developments</li> <li>Marketing of various development elements</li> </ul>	<ul style="list-style-type: none"> <li>Organising/exchange of visits by scholars, eminent personalities, university, research institutes/industries</li> </ul>

Source: MACE analysis

### 16.5. Activities of the TKZC:SPV

Table No. 16.4 outlines the activities of the TKZC:SPV.

Table No. 16.4: Activities of TKZC:SPV

Implementation activities – one time	Post-implementation activities – on-going
<ul style="list-style-type: none"> <li>Project development elements finalisation and technology/university/research institution tie-up (as applicable) finalisation</li> <li>Land acquisition – SE-TP:PIU to facilitate the process</li> <li>Statutory approvals, ESIA approval and follow up with respect to TKZC</li> <li>Topography and contour survey within TKZC</li> <li>Geotechnical investigation within TKZC</li> <li>Finalisation of external water supply source, arrangement for external water supply, power supply and distribution (SE-TP:PIU to provide at the battery limits of TKZC)</li> <li>The arrangement of telecommunication facilities through external sources (SE-TP:PIU to provide at the battery limits of TKZC)</li> <li>Finalising development guidelines and control regulations for TKZC</li> <li>Master planning for TKZC</li> <li>Raise equity and loans to commission TKZC</li> <li>Financial closure for TKZC</li> <li>Establishment of project development elements of TKZC</li> <li>Establishment of general infrastructure facilities and supporting infrastructure facilities like internal pathways, site grading, drainage system, water treatment and water supply, sewerage network, and sewage treatment plant. Also, it includes solid waste management, power distribution, street lighting, communication network, greenery, rainwater harvesting, sustainability infrastructure elements, eco-conservation elements, utilities, common amenities – within TKZC</li> <li>Subzones development- industrial and business – within TKZC</li> <li>Administration zone – within TKZC</li> <li>Multi-facility complex, amenities, utilities – within TKZC</li> </ul>	<ul style="list-style-type: none"> <li>Day to day operation of the development zone and overall administration of TKZC</li> <li>Phased development of TKZC</li> <li>Ensuring efficient operations of all general and specialised infrastructure facilities - within TKZC</li> <li>Facility management and maintenance of TKZC</li> <li>Enforcement of development regulations - within TKZC</li> <li>Up-gradation of the facilities meeting the changing requirements and needs</li> <li>Collection of user fees from visitors of TAF</li> <li>Collection of maintenance revenue from occupant units of IRC</li> <li>Brand image building of the development zone</li> <li>Maintenance of the general, specialised and specific infrastructure - TKZC</li> <li>Maintenance of the environmental infrastructure and compliance with various standards and requirements - TKZC</li> </ul>

Implementation activities – one time	Post-implementation activities – on-going
<ul style="list-style-type: none"> <li>• Establishment of specialised tourism infrastructure facilities – within TKZC</li> <li>• Contractual agreement(s) with occupant units of TKZC</li> <li>• Contractual agreement(s) for other institutional area developments of TKZC</li> <li>• Marketing of the ready-built space, commercial area and institutional area of TKZC</li> </ul>	

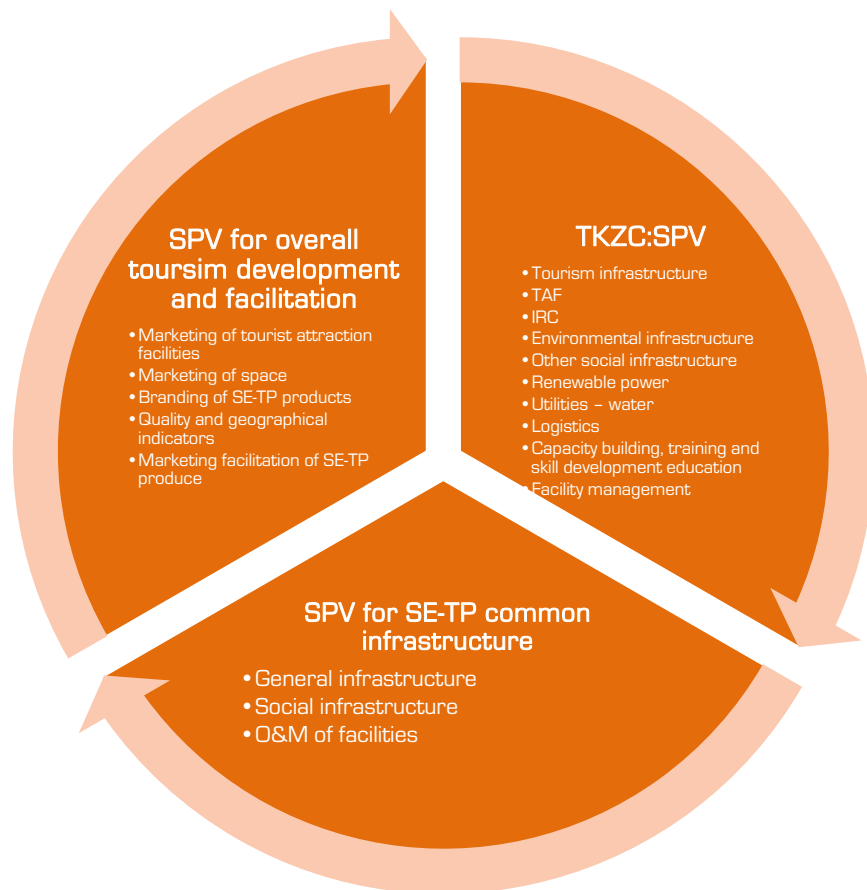
Source: MACE analysis

**16.6. Formation of various SPVs**

Exhibit No. 16.6 depicts the options of forming multiple SPVs leveraging business opportunities. These SPVs either can be a

subsidiary of the main SE-TP:SPV or can be completely independent of an arm’s length transaction between the main SE-TP:SPV and other SPVs.

Exhibit No. 16.6: Various SPV options



Source: MACE analysis

## 16.7. Strategies and policies for SE-TP

### 16.7.1. Need

Tourism is one of the largest and fastest-growing economic sectors in the world and has a considerable role to play in delivering sustainable development in many countries. At the same time, it must be well managed so that it benefits local communities and the natural and cultural environments upon which it depends. Negative aspects underline the need for tourism to be very carefully planned and managed in developing countries. This requires GoB to establish and implement clear policies on the control and management of the sector, more specifically SE-TP, in conjunction with all tourism stakeholders. Thus necessary policies and actions to conserve cultural and natural assets and biodiversity, including through the expansion and effective management of protected areas, are important for sustainable development and operations of SE-TP. Ensuring that the SE-TP is a major force for sustainable development requires a robust and integrated policy framework, and effective, accountable and democratic systems of governance that enable and encourage multi-stakeholder collaboration on tourism planning, development and management.

The development of SE-TP, within the framework of sustainable eco-tourism, can have a positive impact on income generation, job creation and education, and thus on the fighting against poverty and hunger, protection of the environment and the promotion of sustainable development, and can contribute directly to achieving the internationally agreed goals, including the millennium development goals.

### 16.7.2. Core policy initiatives for the SE-TP

**Table Nos. 16.5 to 16.9** discuss the core policy initiatives for the sustenance of the SE-TP from various perspectives. The rationale including objective, emphasis and content & coverage of the policy initiatives and the prime agency vested with the responsibility of formulation and implementation are also presented in these tables.

To ensure that the SE-TP is properly positioned as a growth engine and force for sustainable development, SE-TP should be given due recognition across GoB. Adequate legislation and regulations should be in a place that is sufficient to control and guide SE-TP development while being sensitive to the needs of the sector. Structures and processes to be in the place that enables and encourage private sector interests and other stakeholders to work with GoB on SE-TP planning, development and management. A long-term development framework for tourism (10-20 years) with emphasis on policy and strategy, planning, institutional strengthening, legislation and regulation, product development and diversification, marketing and promotion, tourism infrastructure and the superstructure, economic impact of tourism and tourism investment, human resource development, and socio-cultural and environmental impacts of tourism is needed. Apart from a short term (three-year), an action plan for priority actions is to be undertaken to kick-start sustainable tourism development and preparation of several demonstration projects for pilot areas. The study provides an appropriate framework for this end.

SE-TP must be competitive if it is to succeed as a force for development. The performance and impact of the SE-TP need to be properly measured and monitored across economic performance, investment and competitiveness. The actions should be pursued which provide an enabling environment for the development of small local enterprises, including improving linkages between tourism and other sectors, such as agriculture, handicraft and other creative industries, and between businesses. Above all, there is a need to ensure that tourism products and services are in line with the requirements of growth markets, with actions in place to improve quality standards, fill product gaps and pursue effective marketing strategies, including the use of new media, which have transformed the promotion of travel and tourism. The need to underpin the resilience of the SE-TP should also be addressed. The policy initiative suggested address these aspects adequately.

SE-TP is fundamentally a people-based activity covering employment, decent work and human capital and hence appropriate measures

include careful planning of human resources, involving consultation with private enterprises and employee representatives, is needed to ensure that SE-TP can fulfil its employment creation potential and has a sufficient supply of suitably skilled labour to meet future growth. The decent work agenda, addressing income, working conditions, personal development, freedom of expression and equal opportunity, should be backed by labour laws that are respected across the SE-TP and a framework is suggested in this study.

A range of mechanisms and policy are identified for increasing the proportion of tourism income that reaches and benefits the poor, rural communities involving employment, skill development, supply chains, working with informal traders, tourism value chain actors and enterprise formation and, more widely, the application and use of tourism charges, voluntary giving, and collateral benefit from SE-TP investment. Particular attention is paid to the needs of women, minorities, disabled people, and the elderly and young people, all of whom can engage effectively in the SE-TP.

The SE-TP offer special opportunities for benefiting poor and disadvantaged people besides contributing significantly for poverty reduction and social inclusion. Hence SE-TP specific policy on labour and creation of large-scale employment opportunities to the local community, including skill development and capacity building is evolved. Poverty reduction, social inclusion and creation of large-scale employment through SE-TP requires commitment from GoB and the private sector

with relevant policies and tools, such as value chain analysis, to determine which interventions can best take place to support poor communities.

The contribution of SE-TP to climate change, especially through emissions from transport and stay facilities, operation of various infrastructure within the infotainment zone, activities of knowledge centre zone requires mitigation measures. At the same time, it is essential that the SE-TP adapts to the impact of climate change, in the way that the facilities are planned, for example on adventure tourism facilities on coasts, and in terms of the effect on domestic and foreign markets. Recognising SE-TP's unique relationship and interdependency to both the natural and cultural environment is essential to protecting and safeguarding these valuable assets. Effective management of cultural heritage, protected areas, and biodiversity, including the importance of the sustainable management of natural resources such as water and energy, are required while developing SE-TP and these aspects are addressed through an appropriate policy framework.

Other aspects to be addressed include ensuring the security of both life and assets of visitors, extensive tourism marketing and promotion, development and expansion of tourism facilities in other locations to complement SE-TP, providing river transport network using local river/khal, holistic development of tourism infrastructure in Sonadia and surrounding area, development of sea-beach and some adjoining areas as an exclusive zone for foreign tourist and other sustainable eco-tourism practices.

**Table No. 16.5: Strategies and policies for SE-TP – Tourism governance and structure (TGS)**

<b>SE-TP: TGS-P1: SE-TP development of MP&amp;DP</b>
<b>Formulation and implementation agency:</b> GoB, BEZA, GoT, SE-TP:PIU, and SE-TP:SPV
<b>Rationale:</b>
<b>Objective:</b>
<ul style="list-style-type: none"> <li>• Formulate a 30 years development framework for SE-TP.</li> </ul>
<b>Emphasis:</b>
<ul style="list-style-type: none"> <li>• Eco-conservation and protection of biodiversity;</li> <li>• Sustainable tourism development; and</li> <li>• Triggering large scale employment through SE-TP;</li> </ul>
<b>Content and coverage:</b>
<ul style="list-style-type: none"> <li>• Policy and strategy;</li> </ul>

<ul style="list-style-type: none"> <li>• Planning and institutional strengthening;</li> <li>• Legislation and regulation;</li> <li>• Eco-Tourism offerings, product development and diversification;</li> <li>• Rural and agro-tourism development;</li> <li>• Knowledge-based green economy growth;</li> <li>• Marketing, branding and promotion;</li> <li>• Tourism infrastructure and infotainment zones;</li> <li>• Socio-economic impact of SE-TP and IRC investment;</li> <li>• Private sector and PPP development model for TAF and TKZC;</li> <li>• Human resource and skill development;</li> <li>• Community participation;</li> <li>• Socio-cultural and environmental impacts of SE-TP;</li> <li>• Pilot initiatives;</li> <li>• Innovation and research for societal growth; and</li> <li>• Key Performance Indicators (KPIs) and priority actions for ensuring objective fulfilment and kick-start of sustainable eco-tourism development.</li> </ul>
<b>SE-TP: TGS-P2: SE-TP physical planning and development</b>
<b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, and SE-TP:SPV
<b>Rationale:</b>
<b>Objective:</b> <ul style="list-style-type: none"> <li>• Formulate a guideline for physical planning and development, including the enhanced level of transparency in governance and management.</li> </ul>
<b>Emphasis:</b> <ul style="list-style-type: none"> <li>• Whole family infotainment;</li> <li>• Ensuring principles of sustainable eco-tourism development;</li> <li>• Conducive environment for cutting edge innovation and research; and</li> <li>• Transparency and reporting.</li> </ul>
<b>Content and coverage:</b> <ul style="list-style-type: none"> <li>• Guidelines for the development;</li> <li>• Planning guidelines;</li> <li>• Development control regulations;</li> <li>• Operational guidelines;</li> <li>• Compliance checklist and reporting system;</li> <li>• ICT application in governance and management; and</li> <li>• Dashboard.</li> </ul>
<b>SE-TP: TGS-P3: Quality standards in SE-TP offerings and services</b>
<b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV
<b>Rationale:</b>
<b>Objective:</b> <ul style="list-style-type: none"> <li>• Formulate a guideline for enhancing quality standards in offerings and services for the sustenance of SE-TP initiative and stay ahead of the competition.</li> </ul>
<b>Emphasis:</b> <ul style="list-style-type: none"> <li>• Compliance to ISO and other established international, national and local standards;</li> <li>• Skill development and training to the local community; and</li> <li>• Focus on increasing domestic and foreign tourist visits due to enhanced satisfaction of visitors.</li> </ul>

<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• List of ISO and other standards;</li> <li>• Quality manual and training;</li> <li>• Hierarchy and functions;</li> <li>• Rewards programme;</li> <li>• KPIs for tourist and customer-centricity in deliveries and satisfaction; and</li> <li>• Smart application in improving the quality of delivery.</li> </ul>
<p><b>SE-TP: TGS-P4: Capacity building programmes in SE-TP development and management</b></p>
<p><b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</p>
<p><b>Rationale:</b></p>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Large scale local employment creation.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Skill development and training to the local community on various aspects of SE-TP; and</li> <li>• Focus on increasing livelihood opportunities for the local community through better service offerings to domestic and foreign tourist.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• Training requirements;</li> <li>• Training coverage on end to end basis;</li> <li>• Monitoring and evaluation;</li> <li>• Rewards programme; and</li> <li>• KPIs for the capacity building programme.</li> </ul>
<p><b>SE-TP: TGS-P5: Capacity Building of SE-TP Officials</b></p>
<p><b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</p>
<p><b>Rationale:</b></p>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Enhanced tourist visits due to better management.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Skill development and training to the officials of SE-TP; and</li> <li>• Focus on increasing tourism opportunities for the SE-TP through better service offerings to domestic and foreign tourist.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• Training requirements;</li> <li>• Training coverage on end to end basis covering marketing, operational aspects; branding; promotional activities; strategy etc.;</li> <li>• Training on disaster management and risk management;</li> <li>• Monitoring and evaluation;</li> <li>• Rewards programme; and</li> <li>• KPIs for the capacity building programme.</li> </ul>

*Source: MACE analysis and UNWTO guidebook*



**Table No. 16.6: Strategies and policies for SE-TP – Economic performance, investment and competitiveness**

<b>SE-TP: EPIC-P1: Development of investment policies for SE-TP</b>
<b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>Enhanced domestic investments and FDIs for developing SE-TP and its sub-components like tourism infrastructure, TAF and IRC.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>Active involvement of the private sector in development and operation; and</li> <li>Leveraging private sector experience in technical, financial, managerial expertise for better realisation of SE-TP objectives.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>Packaging of opportunities;</li> <li>Bidding process;</li> <li>Selection process;</li> <li>Transparent procurement practices;</li> <li>PPP concession;</li> <li>Monitoring and evaluation; and</li> <li>KPIs for investment promotion activities.</li> </ul>
<b>SE-TP: EPIC-P2: Marketing and promotion plan for SE-TP</b>
<b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>Providing enhanced reach of SE-TP for attracting international tourist, domestic tourist and knowledge-based green economy growth companies.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>Vibrant and powerful marketing and brand building;</li> <li>Enhanced repeat and new visitors both international and domestic tourist;</li> <li>Increased visibility of SE-TP and its components;</li> <li>Active involvement of the private sector in development and operation; and</li> <li>Leveraging private sector experience in technical, financial, managerial expertise for better realisation of SE-TP objectives.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>Unique Selling Propositions (USPs) of SE-TP;</li> <li>Whole family infotainment model;</li> <li>Wide range of tourism sectors;</li> <li>Quality and quantity of tourism offerings and products;</li> <li>The diverse nature of domestic, regional and international source markets;</li> <li>Development of comprehensive tourism marketing and development plan;</li> <li>Brand image, and positioning;</li> <li>Quality and distribution of promotional materials (including e-marketing);</li> <li>Institutional mechanisms for marketing and promotion including PPP;</li> <li>Training on crisis and risk management;</li> <li>Strategies to ensure the safety and security of the tourists and their belongings;</li> <li>Monitoring and evaluation; and</li> <li>KPIs for marketing and promotion activities.</li> </ul>

<b>SE-TP: EPIC-P3: Product and services development and diversification including business development</b>
<b>Formulation and implementation agency: BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Providing enhanced value creation to tourist and value captured to the local and rural community through innovative tourism products and services.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Inclusive, sustainable growth; and</li> <li>• Vibrant and powerful modes of the engaging rural community.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• USPs of rural community offerings;</li> <li>• Tenets of rural tourism and agro-tourism;</li> <li>• Scope of engagement;</li> <li>• Wide range of tourism sectors for local community engagement;</li> <li>• Quality and quantity of tourism offerings and products;</li> <li>• The diverse nature of domestic, regional and international tourist;</li> <li>• Brand image, and positioning;</li> <li>• Quality and distribution of promotional materials (including e-marketing);</li> <li>• Institutional mechanisms for marketing and promotion;</li> <li>• Monitoring and evaluation; and</li> <li>• KPIs for product and services development and diversification.</li> </ul>
<b>SE-TP: EPIC-P4: Facilitation of demand-driven business linkages between agri-foods, creative industries and service providers and the tourism sector</b>
<b>Formulation and implementation agency: BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Providing sustainable backward linkage for the sustenance of SE-TP and its components and capacity building, including tour operators.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Providing an appropriate ecosystem for inclusive, sustainable growth;</li> <li>• Effective backward linkages and co-ordination with input suppliers;</li> <li>• Vibrant and powerful modes of engaging local and rural community;</li> <li>• Capacity building for sustained supply; and</li> <li>• Vibrant tourism operator's involvement in SE-TP.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• USPs of rural community offerings;</li> <li>• Create sustainable backward linkages between micro-producers and service providers and the tourism sector (hotels, restaurants, tour operators);</li> <li>• Tenets of rural tourism and agro-tourism;</li> <li>• Scope of engagement;</li> <li>• Wide range of tourism sectors for local community engagement;</li> <li>• Quality and quantity of tourism offerings and products;</li> <li>• The diverse nature of domestic, regional and international tourist;</li> <li>• Brand image, and positioning;</li> <li>• Quality and distribution of promotional materials (including e-marketing);</li> <li>• Institutional mechanisms for marketing and promotion;</li> </ul>

<ul style="list-style-type: none"> <li>• Encouragement of marginalised local producers and service providers to respond to the demand requirements for locally sourced products as fruits, vegetables and handicraft and other creative industries products and services (e.g. rural tourism tours, agro-tourism tours, cultural tourism tours, music and dance performance) related to the tourism value chain;</li> <li>• Capacity building of supply chain actors;</li> <li>• Building of supply capacity and related quality enhancement to ensure that agri-food producers, hotels, service providers (tour operators, music and dance groups) and/or creative industries producers can successfully to meet SE-TP requirements;</li> <li>• Integration of sustainability into the tourism supply chain in tour operators' operations;</li> <li>• Monitoring and evaluation; and</li> <li>• KPIs for backward linkages and support functions.</li> </ul>
<b>SE-TP: EPIC-P5: e-Tourism: fostering SE-TP competitiveness through an ICT-centric networking</b>
<b>Formulation and implementation agency: BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Providing ICT based smart applications for enhancing performance and tourist engagement.</li> </ul> <p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Providing appropriate ICT based application for tourist interaction;</li> <li>• Enhance business volume, value and customer-centric operation through smart applications; and</li> <li>• Resource optimised utilisation.</li> </ul> <p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• ICT based application for bookings, data gathering and service delivery;</li> <li>• Developing the culture of e-business tourism solutions;</li> <li>• Capacity building including change management in behavioural, organisational and technological tools;</li> <li>• Strategies for promoting cooperation and partnerships in e-tourism;</li> <li>• Develop SMEs' competitiveness;</li> <li>• Monitoring and evaluation; and</li> <li>• KPIs for ICT based smart applications.</li> </ul>

*Source: MACE analysis and UNWTO guidebook*

**Table No. 16.7: Strategies and policies for SE-TP – Employment, decent work and human capacity**

<b>SE-TP:EDWHC-P1: Manpower planning for the SE-TP including capacity building, skills development, education and vocational training, youth and women empowerment and decent work environment</b>
<b>Formulation and implementation agency: BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Providing large scale rural employment and capacity building;</li> <li>• Trigger local economy and poverty reduction;</li> <li>• Extensive engagement of youth and women; and</li> <li>• High quality trained people for sustainable operation of SE-TP and its sub-components.</li> </ul> <p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Identification of opportunities for rural engagements;</li> <li>• Establishment of skill development and capacity building centre;</li> </ul>

<ul style="list-style-type: none"> <li>• Strengthening of tripartite structures for enhancing the productivity and quality of labour for the benefit of employers, workers and governments;</li> <li>• Providing decent work environment;</li> <li>• Youth and women empowerment; and</li> <li>• Providing enhanced tourist experience with high quality trained staff.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• Addressing human and resource requirements through capacity creation;</li> <li>• Training needs and programmes;</li> <li>• Areas of concentration in ensuring tourist-centric behaviours;</li> <li>• Capacity building programmes in hospitality skills and tourism business development;</li> <li>• International standards exposure;</li> <li>• Intensive training to local communities/private sector in various aspects of development and management of SE-TP and hospitality skills to provide them with better opportunities to seek employment in the SE-TP;</li> <li>• Assessment of the gap between the private sector needs and the local supply of trained tourism staff;</li> <li>• Build capacities of local people to benefit from employment and career in SE-TP based on the gaps identified between the private sector needs and the availability of local skilled manpower;</li> <li>• Strategies to engage youth in SE-TP in various capacity;</li> <li>• Strategies to unlock women's trade potential in SE-TP by systematically integrating gender considerations in MP&amp;DP;</li> <li>• Dashboard development;</li> <li>• Monitoring and evaluation; and</li> <li>• KPIs for manpower and HR-related aspects, skill development, youth and women engagement for inclusive, sustainable operations encompassing general equality, decent work and economy growth.</li> </ul>

*Source: MACE analysis and UNWTO guidebook*

**Table No. 16.8: Strategies and policies for SE-TP – Poverty reduction and social inclusion**

<p><b>SE-TP:PRSI-P1:</b> Facilitating pro-poor growth initiatives in SE-TP including eco-tourism value chain, triggering local economic development, promoting rural tourism and SME development</p>
<p><b>Formulation and implementation agency:</b> BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</p>
<p><b>Rationale:</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• To work towards no poverty, zero hunger and promote inclusive growth;</li> <li>• Providing large scale rural employment and capacity building;</li> <li>• Trigger local economy and poverty reduction through year-around employment and improving livelihood opportunities;</li> <li>• Extensive engagement of youth and women; and</li> <li>• High quality trained support staff for sustainable operation of SE-TP and its sub-components.</li> </ul> <p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Identification of poverty reduction initiatives;</li> <li>• Identification of opportunities for rural engagements;</li> <li>• Establishment of skill development and capacity building centre;</li> <li>• Strengthening the active participation of local people;</li> <li>• Ensuring livelihood opportunities in a sustainable manner;</li> </ul>

- Focus on tripartite structures for enhancing the productivity and quality of labour for the benefit of employers, workers and governments;
- Eco-Tourism value chain development;
- Providing decent work environment;
- Youth and women empowerment; and
- Providing enhanced tourist experience with high quality trained staff.

**Content and coverage:**

- Addressing the needs of rural tourism;
- Analysis and mapping of local community capability and scope for involvement in rural and agro-tourism and in other activities;
- Promotion of arts and crafts village;
- Strategies to ensure poverty reduction and year-round engagement;
- Human resource requirements through capacity creation;
- Training needs and programmes
- Areas of concentration in ensuring tourist-centric behaviours;
- Capacity building programmes in poverty alleviation aspects to the SE-TP authorities, hospitality skills and tourism business development;
- International standards exposure;
- Intensive training to local communities/ private sector in various aspects of development and management of SE-TP and hospitality skills to provide them with better opportunities to seek employment in the SE-TP;
- Extensive rural tourism models, homestays and rural tourism entrepreneurship;
- Assessment of the gap between the private sector needs and the local supply of trained tourism staff;
- Build capacities of local people to benefit from employment and career in SE-TP based on the gaps identified between the private sector needs and the availability of local skilled manpower;
- Strategies to engage youth in SE-TP in various capacity;
- Strategies to unlock women's trade potential in SE-TP by systematically integrating gender considerations in MP&DP;
- Strategies for supporting (networks of) existing and new tourism SMEs, including community-based tourism enterprises, with a view to enabling local people to manage tourism enterprises successfully;
- Economic value generation due to value chain initiatives;
- Establishing backward business linkages between local communities and larger tourism enterprises in the SE-TP a destination for the supply of goods and services;
- Building linkages with other rural activities such as agro-tourism;
- Intervention to enhance the local economic impact;
- Guidelines and procedures to curb any form of child exploitation related to tourism (i.e. sexual and labour exploitation, child trafficking);
- Dashboard development;
- Monitoring and evaluation; and
- KPIs for poverty alleviation, skill development, youth and women engagement for inclusive, sustainable operations encompassing general equality, decent work and economy growth, rural tourism development, SME development.

*Source: MACE analysis and UNWTO guidebook*

**Table No. 16.9: Strategies and policies for SE-TP – Sustainability of the natural and cultural environment**

<p><b>SE-TP:SNCE:P1:</b> Capacity building programmes on the application of indicators for sustainable SE-TP development and operations, systematic applications of indicators, bio-diversity and eco-tourism development, local participatory tourism management plans for sustainable use and conservation of biodiversity,</p>
<p><b>Formulation and implementation agency:</b> BEZA, DoE, DoF, NGOs, DoEF, PPP, CoxDA, Ministry of Relief and Rehabilitation, local social organisation, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</p>
<p><b>Rationale:</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Training on sustainable development and operation of SE-TP and indicators;</li> <li>• Sustainable use and conservation of biodiversity;</li> <li>• Development of bio-diversity-based tourism products in SE-TP;</li> <li>• Training and capacity in bio-diversity; and</li> <li>• Sustainable utilisation of the resource, responsible consumption and production.</li> </ul> <p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Indicator based monitoring of sustainable development;</li> <li>• Bio-diversity conservation and extensive training and capacity building on tourism and bio-diversity;</li> <li>• Development and implementing local plans, using participatory approach methods, which valorise bio-diversity as a major capital for SE-TP development;</li> <li>• Protection of coastal ecology;</li> <li>• Protection of eco-tourism;</li> <li>• Protection of rare species;</li> <li>• Protection of healthy environment;</li> <li>• Protection of mangroves;</li> <li>• Protection of endangered species;</li> <li>• Protection of public property;</li> <li>• Prevention of pollution of wetland ecology;</li> <li>• Prevention of water pollution;</li> <li>• Prevention of pollution of coastal resources;</li> <li>• Promotion of tourism;</li> <li>• Promotion of a healthy coastal environment;</li> <li>• Promotion of coastal ecology;</li> <li>• Promotion of a healthy bio diversity environment;</li> <li>• Promotion of firefighting facility and public safety;</li> <li>• Energy efficiency and waste and water management; and</li> <li>• Green buildings and energy-efficient structures.</li> </ul> <p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• Development of SE-TP relevant, sustainable indicators;</li> <li>• Mapping of the potential of local biological diversity for tourism and tourism products;</li> <li>• Strategies to explore how SE-TP can contribute to safeguarding and maintaining local biological diversity;</li> <li>• Strategies for the improvement of local livelihoods through the sustainable use of biodiversity; harmonise tourism planning with local, national and regional legislation and frameworks, in particular on biodiversity conservation;</li> <li>• Strategies for creating sustainable tourism products in SE-TP that increase the socioeconomic welfare of the local community;</li> </ul>

- Training and capacity building on tourism and bio-diversity and their linkages;
- Strategies on how to implement bio-diversity-based tourism products in SE-TP;
- Strategies to integrate culture under all forms tangible and intangible heritage, living heritage, cultural industries and handicraft, museums into the development process through tourism building;
- Strategies to handle tourists' congestion at SE-TP and protect natural assets;
- Strategies for expansion and protection of mangrove forest and green belt program;
- Strategies for conservation of sand dune and their ecology;
- Strategies for conservation of sea turtles and their breeding ground;
- Strategies for conserving and protect all rare species, particularly sea turtles and red crabs;
- Strategies for development of eco-friendly tourism;
- Strategies for restriction to visit turtle breeding zone;
- Strategies for improvement of disaster risk reduction initiatives;
- Strategies for conserve all ponds and water bodies;
- Develop tools and methodologies for energy efficiency, water efficiency, sustainable utilisation of natural resources and ensure responsible consumption and production;
- Strategies to reduce carbon footprint;
- International standards exposure;
- Intensive training to local communities / private sector in bio-diversity;
- Building linkages with other rural activities with bio-diversity;
- Intervention to enhance the local economic impact through bio-diversity measures;
- Dashboard development;
- Monitoring and evaluation; and
- KPIs for sustainable tourism, indicators for environmental, economic, social and cultural aspects of eco-tourism development and protection of natural assets of the SE-TP.

*Source: MACE analysis and UNWTO guidebook*

### 16.7.3. Supporting policy initiatives

Apart from the core policy initiatives, other supporting policy initiatives are also suggested for ensuring the sustenance of SE-TP development and operations and are presented in **Table Nos. 16.10 to 16.12**.

**Table No. 16.10: Strategies and support policies for SE-TP – Housing sector**

<b>SE-TP:HS:SP1: Making provision of affordable housing for the low-income people through regulating land and housing market</b>
<b>Formulation and implementation agency: BEZA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV</b>
<b>Rationale:</b>
<b>Objective:</b>
<ul style="list-style-type: none"> <li>• To support SE-TP working community through proper housing scheme and ensure sustained SE-TP operations; and</li> <li>• Affordability.</li> </ul>
<b>Emphasis:</b>
<ul style="list-style-type: none"> <li>• Functional living accommodation in nearby vicinity; and</li> <li>• Affordability and social inclusion.</li> </ul>
<b>Content and coverage:</b>
<ul style="list-style-type: none"> <li>• Location identification;</li> <li>• Facilities mapping;</li> </ul>

- Layouts;
- End-users;
- Terms of allotment;
- Development guidelines;
- Pricing;
- Quality and development approach;
- Maintenance;
- Dashboard development;
- Monitoring and evaluation; and
- KPIs for sustainable, affordable housing.

*Source: MACE analysis and UNWTO guidebook*

**Table No. 16.11: Strategies and support policies for SE-TP – the Transportation sector**

<b>SE-TP:TS:SP1: Development of efficient connectivity</b>
<b>Formulation and implementation agency:</b> BEZA, RHD, BRTA, SE-TP:PIU, SE-TP:SPV and TKZC:SPV
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• To provide hassle-free multi-modal connectivity to SE-TP.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• Functional, cost-effective transport connectivity; and</li> <li>• Evolving, environmentally solutions.</li> </ul>
<p><b>Content and coverage:</b></p> <ul style="list-style-type: none"> <li>• Development of efficient road network with standard roads;</li> <li>• Promotion of transport facilities between Cox’s Bazar and surroundings;</li> <li>• Development of regional connectivity;</li> <li>• Improvement of the internal road network;</li> <li>• Prohibition to the motorised vehicle on the Island;</li> <li>• Walkways can be developed around the Island to facilitate pedestrians;</li> <li>• Jetty or the terminal improvement;</li> <li>• Dashboard development;</li> <li>• Monitoring and evaluation; and</li> <li>• KPIs for sustainable transportation and connectivity.</li> </ul>

*Source: MACE analysis and UNWTO guidebook*

**Table No. 16.12: Strategies and support policies for SE-TP – Solid waste management**

<b>SE-TP:SWM:SP1: Sustainable solid waste management and waste recycling</b>
<b>Formulation and implementation agency:</b> BEZA, Upazila Parishad and NGOs, DoE and Directorate of Health, SE-TP:PIU, SE-TP:SPV and TKZC:SPV
<b>Rationale:</b>
<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• To support the hygienic environment and scientific management and disposal of solid waste.</li> </ul>
<p><b>Emphasis:</b></p> <ul style="list-style-type: none"> <li>• 100% efficient solid waste management system; and</li> <li>• Waste and energy recovery</li> </ul>
<b>Content and coverage:</b>



- Strategies for improvement of efficiency of the collection method;
- Strategies for recycling of solid waste;
- Strategies for disposal, treatment and sanitary landfill;
- Strategies for the prohibition of scattering, littering and dumping of any kind of waste materials;
- Strategies for waste and energy recovery;
- Dashboard development;
- Monitoring and evaluation; and
- KPIs for sustainable waste management.

*Source: MACE analysis and UNWTO guidebook*

## Chapter – 17

# Project cost

### 17.1. Approach for project cost estimation

The cost of developing the SE-TP, including IRC-CoE&IDC covering hard infrastructure and soft elements are computed. The proposed development element of the SE-TP is detailed in **Table 15.2 and 15.3.**

**Table No. 17.1** provides the details of SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure, and TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries costing and total investment outlay of these development elements for all phases.

**Table No. 17.1: Development elements cost detail**

Major development elements considered for cost computation		
<ul style="list-style-type: none"> <li>○ SE-TP common infrastructure including specialised tourism infrastructure;</li> <li>○ SE-TP connectivity and external infrastructure; and</li> <li>○ TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries;</li> </ul>		
General considerations		
<ul style="list-style-type: none"> <li>○ The proposal is to develop SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure, and TKZC common development including TAF and IRC-CoE&amp;IDC and specialised tourism infrastructure within the TKZC boundaries in deferred investment manner to facilitate the flow of investment and to recalibrate the development especially to the market needs; and</li> <li>○ The study includes an analysis of project development investment phasing and computation of investment requirement during each phase of development.</li> </ul>		
Sl. No.	Development element	Details
1	SE-TP common infrastructure including specialised tourism infrastructure	<ul style="list-style-type: none"> <li>○ Planned to be developed in a deferred investment manner (in three phases) over nine years to facilitate domestic and foreign tourist visits to SE-TP and occupant units of IRC-CoE&amp;IDC with flexibility for market calibration</li> <li>○ Phase-I investment in 1<sup>st</sup> and 2<sup>nd</sup> year</li> <li>○ Phase-II investment in 5<sup>th</sup> and 6<sup>th</sup> year and</li> <li>○ Phase-III investment in 9<sup>th</sup> year.</li> </ul>
2	SE-TP connectivity and external infrastructure	<ul style="list-style-type: none"> <li>○ Planned to be developed over two years to facilitate domestic and foreign tourist visits to SE-TP and occupant units of IRC-CoE&amp;IDC.</li> </ul>
3	TKZC common development including TAF and IRC-CoE&IDC and specialised tourism	<ul style="list-style-type: none"> <li>○ Planned to be developed in a deferred investment manner (in three phases) over nine years to facilitate domestic and foreign tourist visits to SE-TP and occupant units of IRC-CoE&amp;IDC with flexibility for market calibration;</li> </ul>

	infrastructure within the TKZC boundaries	<ul style="list-style-type: none"> <li>○ Full operations of SE-TP including IRC-CoE&amp;IDC from 10<sup>th</sup> year onwards</li> <li>○ Phase-I investment in 1<sup>st</sup> and 2<sup>nd</sup> year</li> <li>○ Phase-II investment in 5<sup>th</sup> and 6<sup>th</sup> year and</li> <li>○ Phase-III investment in 9<sup>th</sup> year.</li> </ul>
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### The approach towards cost estimation

- Besides the cost of the project development elements, the cost includes preliminary and pre-operative expenses, know-how fees, design, and detail engineering fees, project management expenses, training expenses;
- Further, the cost includes contingency provision for any unforeseen situation and increase in unit rates;
- The exercise includes the estimation of cost based on the schedule of rates published by the competent public authorities, prevailing market prices, in-house databank, and experience gained over similar/comparable development commensurate with the nature of development and the target market segment;
- The factors considered for project cost estimates for the identified development activities would include:
  - Type of construction for each project development elements and identified facilities;
  - Specification for developments and type of finishes required;
  - Special provisions for health and safety norms, eco-tourism projects & circular economy, biomimicry;
  - Special provisions for energy-efficient and green buildings;
  - Utility provisions as per applicable codes and standards;
  - Electro-mechanical utilities with power back-up for essentials and distribution network;
  - Special features concerning structures, civil works, equipment and facilities for SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure and TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries;
  - Environmental infrastructure covering water, wastewater, and solid waste management; and
  - Sustainability elements, smart features, smart monitoring, and green infrastructure.
- Refer to **Exhibit No. 17.1**, depicting the process of cost computation.

### General development

- The cost computation excludes the land lease cost or other costs towards the land;
- The SE-TP:PIU need to consider the land compensation cost (if applicable), and this needs to be facilitated/funded by BEZA or through its designated nodal agencies. Further, necessary training and skill development need to be imparted, and SE-TP:PIU, SE-TP:SPV and TKZC:SPV shall provide employment opportunities besides land compensation. Also, efforts shall be taken for imbining entrepreneur skills to the select rehabilitated people and provide necessary assistance for them to establish SME units in the SE-TP or provide rural tourism or provide backward linkages. As such, the project cost estimates exclude such provisions and training cost;
- For subsequent years, i.e., during the operational phase, the operational, administrative cost includes land lease rental;
- It is required to create the necessary site development as detailed in the earlier part of the report;
- Work on the site development would include the cost of development of the overall land area, laying roads, internal pathways, fencing, landscaping, main entrance & security; and
- The study appropriately earmarks various zones like entrance zone, heritage & hospitality zone, knowledge centre zone, family entertainment zone, adventure zone and eco-science zone with supporting facilities, taking into account various technological aspects and regulations.

### **Buildings & civil works**

- The buildings & civil works consist of developing various tourism facilities, research facilities, social, facilities, commercial, administrative buildings, other buildings, open area facilities and other miscellaneous civil works; and
- Minimum ready-built IRC-CoE&IDC facilities are essential for triggering especially knowledge-based green economy investments, and Phase-I investment development incorporates specialised facility requirements to enable plug and play operation;
- Subsequent phases include additional ready-built factories established as per market demand.

### **Plant, machinery, and equipment's**

- The plant, machinery and equipment's consist of environmental infrastructure, water treatment plants, water supply lines, waste management and sewerage lines;
- Further, it also includes electrical and communication networks comprising of transformer and captive backup power generation sets for the essentials, LT switchboards, and cables, special light fittings, an electrical installation; and
- Apart, air conditioning and ventilation system, utilities like ducting, piping, compressed air, solid waste management system, firefighting equipment's and other such infrastructure/utilities constitute plant and machinery.

### **Specialised and specific tourism and innovation & research infrastructure**

- Specialised tourism infrastructure for TAF in the entrance zone, heritage & hospitality zone, knowledge centre zone, family entertainment zone, adventure zone and eco-science zone; and
- Specialised facilities for IRC-CoE&IDC to support innovation & research activities on life sciences, alternative & renewable energy, environment technologies & sustainable business practices, innovative materials and innovative products, built environment & sustainable communities, design, engineering, technical, consulting, advisory & research services.

### **Miscellaneous fixed assets**

- The miscellaneous fixed assets would include furniture & fittings, office equipment's, audio-visual equipment and computer system.

### **Provision for marketing and consultancy expenses**

- The exercise includes project consultancy expenses for meeting the design and detailed engineering expenses, project supervision and project management activity; and
- Also, expenses towards project launch and marketing also need to be met out from the project cost.

### **Preliminary expenses & entity formation expenses and others**

- Apart from the cost of tangible assets described above, the exercise includes provision for other categories of expenditure necessary for the establishment of the various development elements. The preliminary expenses cover expenses involved in creating SPVs and sub-SPVs related expenditures;
- TKZC:SPV shall create several sub-SPVs in a phased manner for effectively providing the O&M services; and
- The company formation expenses include incorporation, memorandum of association, legal expense, and formation of governing bodies.

### **Pre-operative expenses**

- The preoperative expenses relate to site establishment expenses during the project implementation period, travelling and conveyance, insurance, and other start-up expenses.

### **Provision for contingencies**

- A provision at the rate of 10% on the non-firm cost of the estimated project cost such as site development, buildings, equipment's and support machinery, pre-operative expenses and

miscellaneous fixed assets are made to meet the escalation in the prices of these items during the implementation period.

#### Interest during construction

- The exercise includes computation of interest during construction based on the deployment of debt towards capital expenditure. For the cost estimation, the exercise considers a 15% interest rate.

Sl. No.	Development element	Details
1	SE-TP common infrastructure including specialised tourism infrastructure	○ The contribution from SE-TP:PIU (financed through GoB/BEZA contribution), has no finance charges and is on the non-repayable basis from the perspective of SE-TP:PIU
2	SE-TP connectivity and external infrastructure	○ GoB shall enter an agreement with other financial institutions, if required and shall finance respective Government agencies on a non-repayment basis for funding SE-TP connectivity and external infrastructure. Hence this contribution has no finance charges and is on the non-repayable basis from the perspective of executing agencies.
3	TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries;	○ Applicable for the term loan mobilised by the PPP concessionaire or private sector.

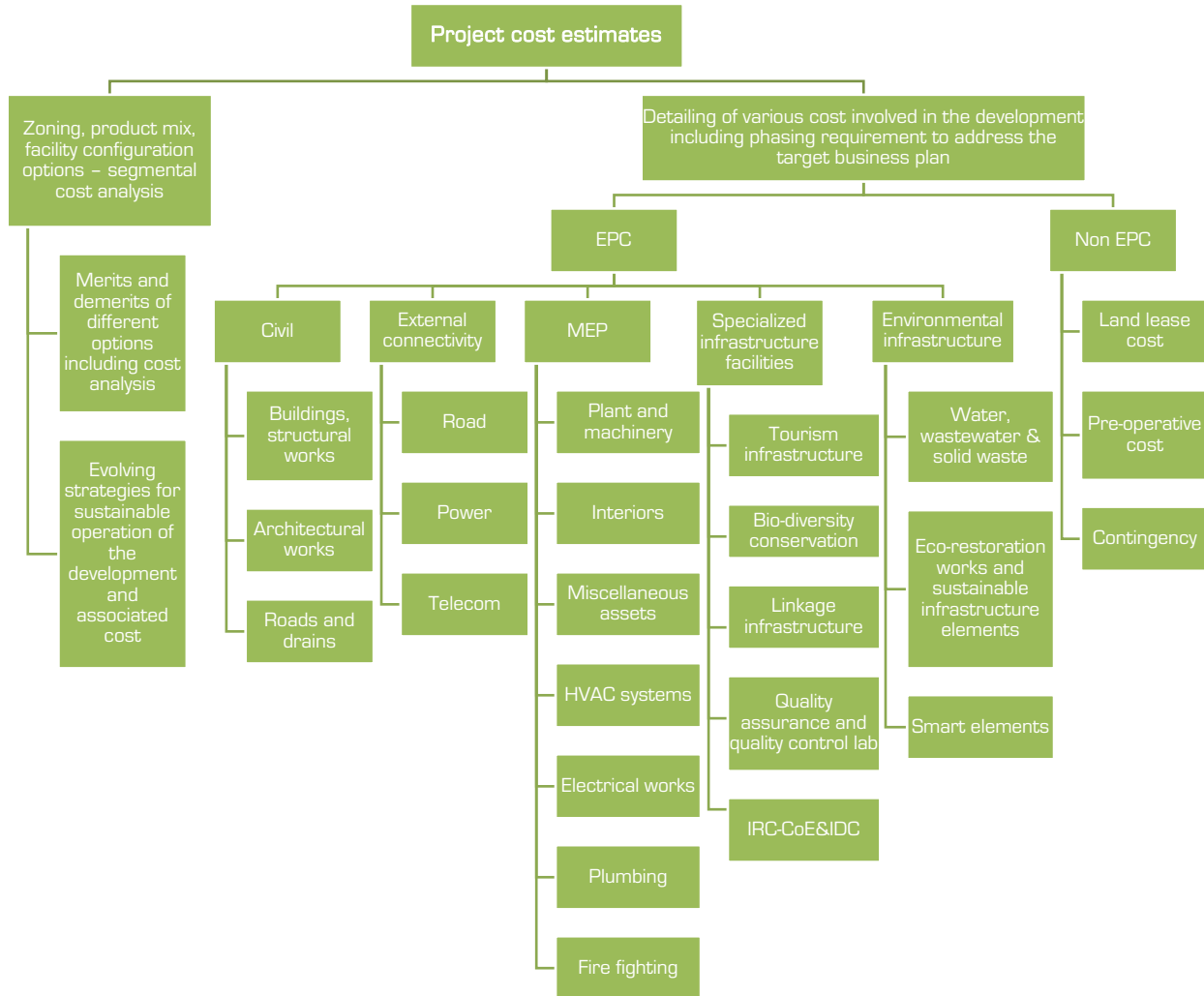
#### Total cost

- The development elements are contemplated to be developed over nine years; and
- It is pertinent to understand that some of the developments need to be carried out in Phase-I investment itself, considering the project as a whole.

Sl. No.	Development element	Details for SE-TP including IRC-CoE&IDC
1	SE-TP common infrastructure including specialised tourism infrastructure	<ul style="list-style-type: none"> <li>○ The cost of Phase-I development is estimated for common infrastructure at <b>Taka 5488.77 million</b>; and</li> <li>○ The total investment outlay for all Phases is <b>Taka 6170.74 million</b> over the development period of 9 years.</li> </ul>
2	SE-TP connectivity and external infrastructure	○ The total expenditure for connectivity and external infrastructure at <b>Taka 547.82 million</b> .
3	TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries	<ul style="list-style-type: none"> <li>○ The cost of Phase-I development is estimated to be <b>Taka 1538.31 million</b>; and</li> <li>○ The total investment outlay for all Phases is <b>Taka 10230.04 million</b> over the development period of 9 years.</li> </ul>

*Source: MACE analysis*

**Exhibit No. 17.1** depicts the process and the considerations involved in project cost computation.



Source: MACE analysis

17.2. Details of cost estimates

17.2.1. SE-TP common infrastructure

Table No. 17.2 and Exhibit No. 17.2 provides the cost of SE-TP common infrastructure.

Table No. 17.2: Cost of SE-TP common infrastructure

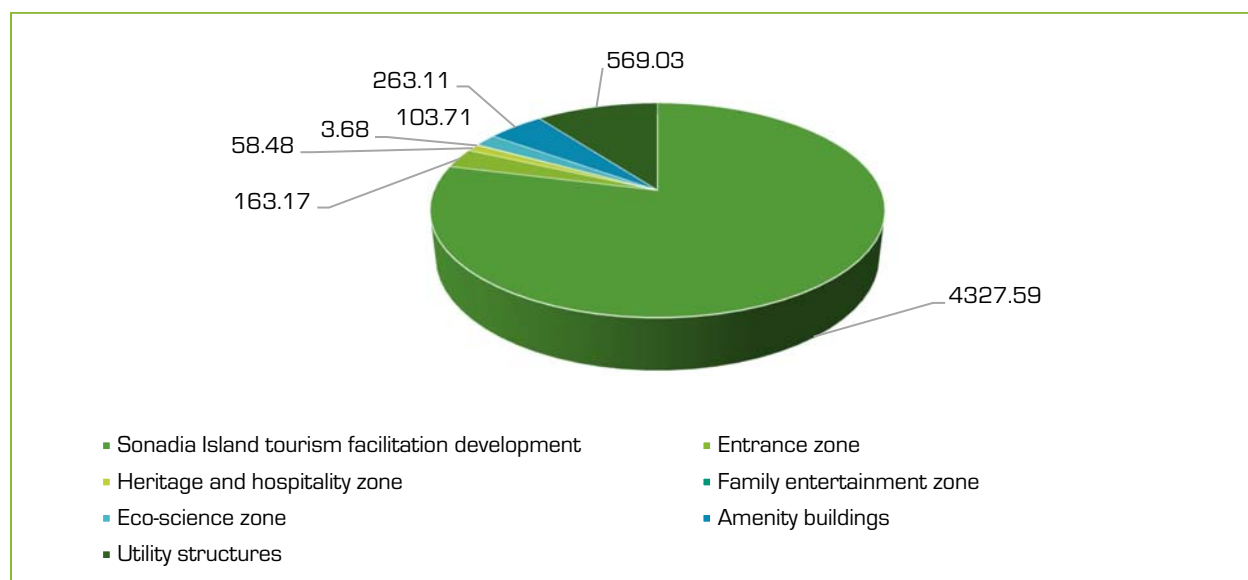
*(Taka in million)*

Sl. No.	Component	Phase I		Phase II		Phase III	Total project cost
		Year 1	Year 2	Year 5	Year 6	Year 9	
1	Sonadia Island tourism facilitation development	1731.04	2596.55	45.70	45.70	21.53	4440.52
2	Entrance zone	65.27	97.90				163.17
3	Heritage and hospitality zone	23.39	35.09				58.48

Sl. No.	Component	Phase I		Phase II		Phase III	Total project cost
		Year 1	Year 2	Year 5	Year 6	Year 9	
4	Family entertainment zone	1.47	2.21				3.68
5	Eco-science zone	41.48	62.22				103.71
6	Amenity buildings	105.25	157.87				263.11
7	Utility structures	227.61	341.42	227.61	227.61	113.81	1138.07
	<b>Total SE-TP common infrastructure cost</b>	<b>2195.51</b>	<b>3293.26</b>	<b>273.32</b>	<b>273.32</b>	<b>135.33</b>	<b>6170.74</b>
	<b>Grand total</b>		<b>5488.77</b>		<b>546.64</b>	<b>135.33</b>	<b>6170.74</b>

Source: MACE analysis

Exhibit No. 17.2: Cost of SE-TP common infrastructure - Phase I (Taka in million)



Source: MACE analysis

### 17.2.2. SE-TP connectivity and external infrastructure

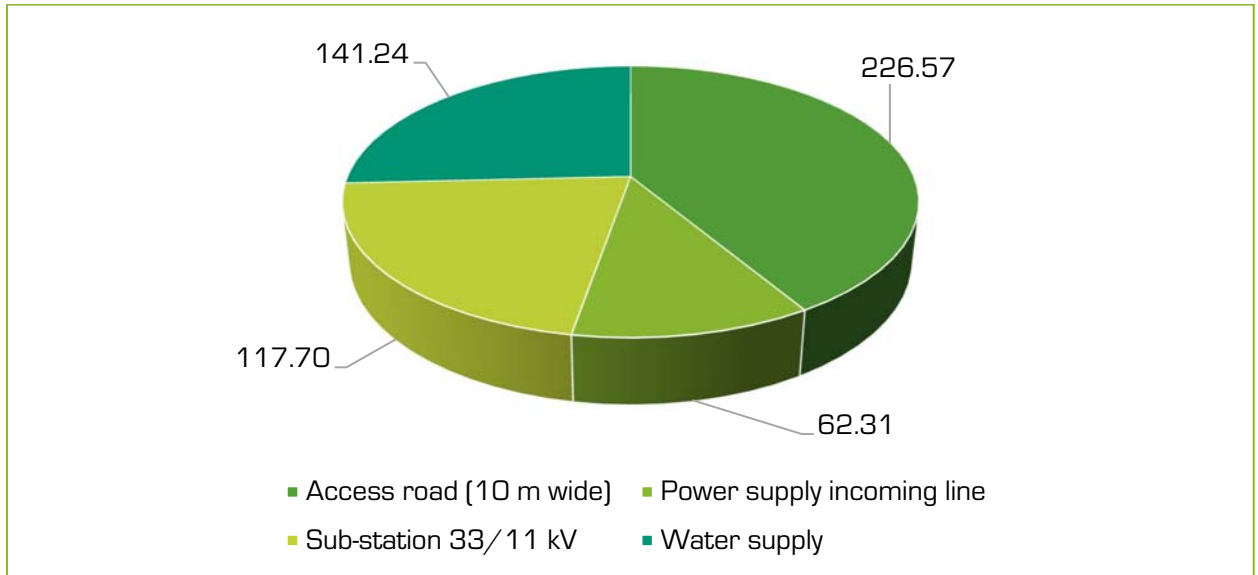
Table No. 17.3 and Exhibit No. 17.3 provides the cost of SE-TP connectivity and external infrastructure.

Table No. 17.3: Cost of SE-TP connectivity and external infrastructure

Sl. No.	Component	Phase I cost		Total cost
		Year 1	Year 2	
		1	Access road (10 m wide)	90.63
2	Power supply incoming line	24.92	37.39	62.31
3	Sub-station 33/11 kV	47.08	70.62	117.70
4	Water supply	56.50	84.74	141.24
	<b>Total offsite infrastructure cost</b>	<b>219.13</b>	<b>328.69</b>	<b>547.82</b>

Source: MACE analysis

**Exhibit No. 17.3: Cost of SE-TP connectivity and external infrastructure (Taka in million)**



Source: MACE analysis

*17.2.3. TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries*

Table No. 17.4 below gives the development element cost details and phase-wise investment. Exhibit No. 17.4 below gives the development element cost details. Exhibit No. 17.5 provides details of the phase-wise investment.

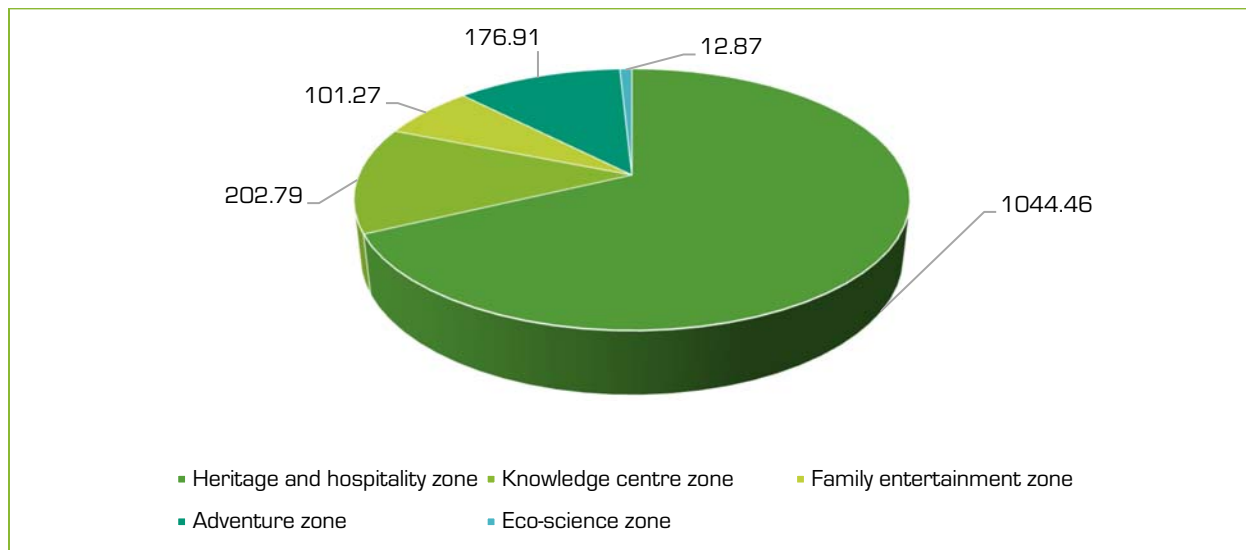
**Table No. 17.4: TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries - Project cost estimate (Taka in million)**

Sl. No.	Component	Phase I		Phase II		Phase III	Total project cost
		Year 1	Year 2	Year 5	Year 6	Year 9	
1	Heritage and hospitality zone						
a	Arts & craft village	28.60	42.90	32.49	32.49		136.48
b	Star hotel	239.48	359.22	293.67	293.67		1186.04
c	Business & relaxation	149.71	224.56	133.51	133.51		641.29
2	Knowledge centre zone	81.12	121.68	162.16	162.16	335.65	862.77
3	Family entertainment zone	40.51	60.76	50.63	50.63		202.54
4	Adventure zone	70.76	106.15	88.45	88.45		353.82
5	Eco-science zone	5.15	7.72	1744.09	1744.09	3346.05	6847.11
	<b>Total cost</b>	<b>615.32</b>	<b>922.98</b>	<b>2505.02</b>	<b>2505.02</b>	<b>3681.70</b>	<b>10230.04</b>
	<b>Grand total</b>		<b>1538.31</b>		<b>5010.04</b>	<b>3681.70</b>	<b>10230.04</b>

Source: MACE analysis

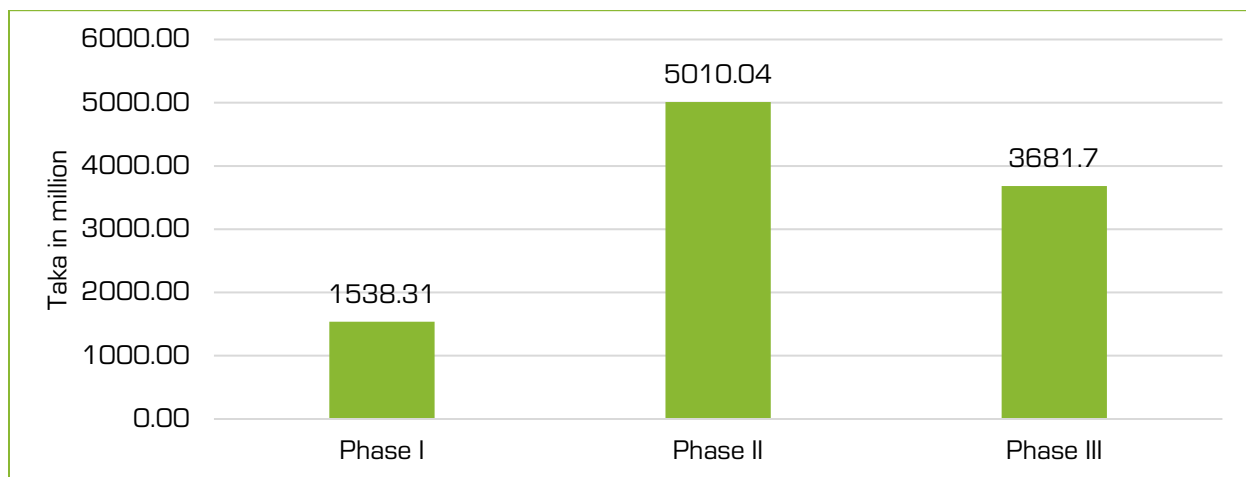


Exhibit No. 17.4: TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries – Phase I development (Taka in million)



Source: MACE analysis

Exhibit No. 17.5: TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries - Phase-wise project cost



Source: MACE analysis

### 17.3. Summary of SE-TP total investment

Table No. 17.5 provides a summary of the total investment of SE-TP with development mode details. The table also includes a) funding through GoB/BEZA and implemented through SE-TP:PIU; b) funded through GoB and

implemented by third-party respective Government agencies, and c) investment by PPP or private sector.

The total investment in SE-TP, excluding investment by occupant units of IRC-CoE&IDC works out to **Taka 16948.61 million**.

Table No. 17.5: Summary of SE-TP total investment and mode of development

*(Taka in million)*

SI No.	Component	Mode of development		
		SE-TP:PIU	Third-party - Government	TKZC:SPV
1	Sonadia Island tourism facilitation development	4440.52		
2	Entrance zone	163.17		
3	Heritage and hospitality zone	58.48		1963.81
4	Knowledge centre zone			862.77
5	Family entertainment zone	3.68		202.54
6	Adventure zone			353.82
7	Eco-science zone	103.71		6847.11
8	Amenity buildings	263.11		
9	Utility structures	1138.07		
10	Connectivity and external infrastructure		547.82	
	<b>Total</b>	<b>6170.74</b>	<b>547.82</b>	<b>10230.04</b>
	<b>Total project cost</b>		<b>16948.61</b>	

*Source: MACE analysis*

## Chapter – 18

# SE-TP including IRC-CoE&IDC branding and marketing strategies

### 18.1. Strategies

The strategies include the adoption of well-planned strategic branding & advertising campaign and other sales promotion methods to promote this unique concept and in identifying the developer for IRC-CoE&IDC and an anchor tenant for IRC-CoE&IDC including various TAF developments and overall branding of SE-TP.

It is pertinent to create an identity and develop a communication strategy to inform

target groups, including developers/co-developers about SE-TP initiative and EPC and O&M agencies. Good branding provides opportunities for greater collaboration and synergies. It provides an external manifestation of strategic intent and creates differentiation in the market.

**Table No. 18.1** highlights the key tasks involved in media and communication plan for promoting SE-TP.

**Table No. 18.1: Strategies and action plan**

Mode of communication	Core purpose – creating brand and identity
System elements – word mark, tagline, word mark in regional/international languages	<div> </div> <ul style="list-style-type: none"> <li>○ Regional and international languages – Bangla, English, French, Arabic, Chinese, Japanese, Korean, German, Spanish, Dutch, Portuguese, Hindi and other regional languages</li> </ul>
System elements – stationery system	<ul style="list-style-type: none"> <li>○ Letterhead, envelope, business card, memo envelope, the compact disc including the cover, press kit, compliments slip + notepad</li> </ul>
System elements – collateral system	<ul style="list-style-type: none"> <li>○ Brochure, poster, newsletter, standee, folder, wallpaper, annual report, banner</li> </ul>
System elements – signage system	<ul style="list-style-type: none"> <li>○ High-level building signs, office premises, vernacular signage's, directional signage</li> </ul>

Mode of communication	Core purpose – creating brand and identity								
System elements – advertising system and a digital system	<ul style="list-style-type: none"> <li>○ Newspapers, sector magazines, electronic media</li> </ul>								
Website	<ul style="list-style-type: none"> <li>○ Dynamic &amp; quick means of communication is an essential element. The activities include designing a website highlighting the opportunities; the role played by GoB details of significant project development activities and matters related to sustainable tourism and research activities in SE-TP. The hosting of website and management by BEZA through designated agencies ably supported by various organisations, regional administration, national and international consultants is essential for marketing. The website will be user covering in a friendly way the interest of various stakeholders and will be highly interactive. The website layout design will adopt the latest technology and will be hosted on unlimited bandwidth.</li> </ul>								
Information kit	<ul style="list-style-type: none"> <li>○ Details each project development element and development zone. The following outlines various sub-tasks involved:               <ul style="list-style-type: none"> <li>➤ Develop the layout</li> <li>➤ Artwork for the information kit</li> <li>➤ Printing of the information kit</li> </ul> </li> <li>○ The activity includes designing and developing an e-brochure. Uploading the e-brochure on the website for a larger circulation is essential. Visitors can flip through (the e-brochure) to understand the salient features of SE-TP and various opportunities</li> </ul>								
Stakeholder consultation kit	<ul style="list-style-type: none"> <li>○ Detailed information on the project, status of the statutory approvals, project progress</li> <li>○ Information on expected benefits to key stakeholders such as rural community, tourism operators, eco-conservation agencies, researchers, investors, private sector developers and others</li> </ul>								
AV	<ul style="list-style-type: none"> <li>○ Captures GoB initiatives and details the salient features of SE-TP and envisaged tourism infrastructure, TAF, IRC-CoE&amp;IDC, TKZC investments, covering both domestic and international investments</li> <li>○ Preparation of well-conceived AV film for the project in various regional and international languages</li> </ul>								
Print media: dailies and business newspapers	<ul style="list-style-type: none"> <li>○ The activity includes the development of a brief note about SE-TP, sustainable tourism, TAF, IRC-CoE&amp;IDC, TKZC opportunities, and product offerings. Refer <b>Table No. 18.2</b> for envisaged themes covered for different target groups.</li> </ul> <p style="text-align: center;"><b>Table No. 18.2: Target group and core theme</b></p> <table border="1"> <thead> <tr> <th>Target group</th> <th>Core theme</th> </tr> </thead> <tbody> <tr> <td>Domestic tourist</td> <td>Tourism entertainments, leisure, tourism infotainment and tourism packages.</td> </tr> <tr> <td>Foreign tourist</td> <td>Tourism entertainments, leisure, tourism infotainment and tourism packages.</td> </tr> <tr> <td>Domestic investors</td> <td>Sustainable SE-TP infrastructure, tourism projects, TAF and IRC-CoE&amp;IDC development, built-up space occupancy, TAF, TKZC and backward linkages</td> </tr> </tbody> </table>	Target group	Core theme	Domestic tourist	Tourism entertainments, leisure, tourism infotainment and tourism packages.	Foreign tourist	Tourism entertainments, leisure, tourism infotainment and tourism packages.	Domestic investors	Sustainable SE-TP infrastructure, tourism projects, TAF and IRC-CoE&IDC development, built-up space occupancy, TAF, TKZC and backward linkages
Target group	Core theme								
Domestic tourist	Tourism entertainments, leisure, tourism infotainment and tourism packages.								
Foreign tourist	Tourism entertainments, leisure, tourism infotainment and tourism packages.								
Domestic investors	Sustainable SE-TP infrastructure, tourism projects, TAF and IRC-CoE&IDC development, built-up space occupancy, TAF, TKZC and backward linkages								

Mode of communication		Core purpose – creating brand and identity	
	International investors	Sustainable SE-TP infrastructure, tourism projects, IRC-CoE&IDC development, built-up space occupancy, TAF and TKZC	
	SME and rural	SME and rural prosperity, rural employment opportunities, rural tourism, agro-tourism, backward linkages	
		<ul style="list-style-type: none"> <li>○ The key task includes identification of the various print media (newspapers) and finalisation of the frequency of release of advertisement.</li> </ul>	
Print media: sector-specific journals		<ul style="list-style-type: none"> <li>○ Synopsis about the SE-TP envisaged tourism sector-specific investments and tourism attraction events.</li> <li>○ Sector-specific journals for the release of the advertisement shall also be identified.</li> </ul>	
Electronic media: television & radio		<ul style="list-style-type: none"> <li>○ Flash information about the SE-TP, envisaged tourism sector-specific investments and tourism attraction events during the prime commercial slot.</li> <li>○ As part of the electronic media campaign, the activity includes configuration of themes including identification of the media (TV &amp; FM channels).</li> </ul>	
Others: bag, cap, pens, displays of concepts		<ul style="list-style-type: none"> <li>○ Strategies include designing the following compliments for distribution purposes during the roadshow and other meetings. <ul style="list-style-type: none"> <li>● Designing and developing invites</li> <li>● Design and production of caps, pen, and bag</li> <li>● Conceptualising, designing and developing collaterals for banners, standees, backdrops, labels, wrappers</li> </ul> </li> </ul>	

Source: MACE analysis

## 18.2. Micro-level sub-sector wise project opportunities and project profiles

Table No. 18.3 highlights the micro-level sub-sector wise project opportunities for prospective investors and occupant units.

Table No. 18.3: Preparation of micro-level sub-sector wise project opportunities

<ul style="list-style-type: none"> <li>• Homestays</li> <li>• Bed and breakfast</li> <li>• Tourism attraction facilities</li> <li>• Tourist support functions</li> <li>• Research and innovation activities on life sciences covering agricultural biotechnology, health care and enzyme technology, aquaculture and marine biotechnology, computational biology, industrial biotechnology, bioprocess engineering, environmental technology, waste technology</li> <li>• Research and innovation activities on alternative and renewable energy covering solar PV, solar CSP, hydrogen</li> </ul>	<ul style="list-style-type: none"> <li>• Research and innovation activities on environmental technologies and sustainable business practices covering water, wastewater, waste management, clean environmental technologies, CDM, lifecycle assessment, environmental governance, environmental compliance and sustainability reporting</li> <li>• Research and innovation activities on innovative materials and innovative products encompassing power electronics materials, devices and integrated systems, grid materials, devices and systems, ceramics, chemicals, polymers, superalloys, semi-conductors, medical biomaterials, nanomaterials, biomaterials, advanced processes and computation</li> </ul>
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energy, fuel cells, fuels from sunlight, electric and hybrid electric vehicles, geothermal energy and tidal energy, biomass utilisation, waste to energy technologies, batteries and energy storage, energy efficiency, carbon capture and storage

- Research and innovation activities on the built environment and sustainable communities covering structures research, material research, sustainable materials and technologies, architectural design research, construction and project management, energy-efficient building systems design, indoor environmental quality, a showcase of innovative construction and technologies, building performance and evaluation
- Design, engineering, technical, consulting, advisory and research services

*Source: MACE analysis*

### 18.3. Major marketing programs

The major marketing programs could cover theme-based advertisement programs, roadshows as detailed below:

- Preparation of media plan and media campaign
- Identification of potential investors, developers, and co-developers
- Identification of potential occupant units
- Coordination with various industry associations
- Conducting domestic roadshows
- Holding international roadshows
- Participating in international tourism shows
- Conducting one to one business meetings
- Arranging investor group visit to agro-cluster
- Input and coordination with potential occupant units and follow up
- The signing of various MoUs
- Tourist attraction campaigns
- Business and MICE tourism promotion

### 18.4. International roadshows

Detailed country-wise roadshows shall be conducted for:

1. Attracting TAF and TKZC developer / co-developer
2. Attracting tourism, anchor units in IRC-CoE&IDC
3. Attracting large-scale tourism and allied sector companies to promote activities in SE-TP
4. Attracting large-scale innovation and research companies to promote activities in SE-TP
5. Attracting country partnership for involving in the project in various capacities – technology, know-how, marketing support and country-specific zone development
6. Attracting tourism infrastructure developers
7. Attracting large product marketing support providers

### 18.5. Global Tourism & Knowledge-based Economy Summit (GTKES)

It is envisaged to conduct multiple GTKES, roadshows, B<sub>2</sub>B meetings etc. GTKES will be an ideal forum to showcase cutting-edge technologies / success stories/ partnerships besides promoting investments in the tourism sector and knowledge-based economy centre.

GTKES will be a confluence of the various players interested in developing sustainable tourism and knowledge-based industry in Bangladesh and **Exhibit No. 18.1** indicate the typology of interested players.

Exhibit No. 18.1: GTKES – Confluence of interested players

International tourism and destination developers	Leading tourism operators	Leading technology suppliers	Leading machinery, equipment suppliers	Leading research and education universities & institutes
Leading market and branding institutions	Leading tourism infrastructure developers	Leading research centre developers	Specialised eco-tourism developers and operators	Leading tourism support green industries
International & domestic investors	Financial institutions and banks	Nodal agencies	Rural community associations	Sector experts

Source: MACE analysis

### 18.6. Strategies for popularising SE-TP

Table No. 18.4 provides some of the strategies proposed for popularising SE-TP.

Table No. 18.4: Strategies for popularising SE-TP

<ul style="list-style-type: none"> <li>• Publishing information in tourism, newsletter and research sector magazine</li> <li>• Participating in international and domestic tourism and allied sector summit and conferences</li> <li>• Professional membership in the international organisation on tourism and knowledge-based green economy</li> <li>• Engaging professional agency for corporate publication</li> <li>• Promoting SE-TP through websites and brochures of partners / universities / research institutes / occupant units</li> <li>• Library with the latest books, publications, an encyclopaedia on related areas</li> <li>• A virtual library on the internet on the website</li> <li>• SE-TP shall also actively develop the e-learning industry, including the development of innovative education courseware, methodologies, tools, and processes, to reach out to a wider market</li> </ul>	<ul style="list-style-type: none"> <li>• Conducting regular international seminar / conference on tourism and knowledge-based green economy</li> <li>• Regular industry – manufacturers – exporters – institution interaction forum</li> <li>• Conducting regular thematic exhibitions dealing with contemporary issues and subjects</li> <li>• Celebrating birthdays and other important days and promote the SE-TP initiative</li> <li>• Honouring young firms and individuals in the field of tourism and knowledge-based green economy</li> </ul>
<ul style="list-style-type: none"> <li>• Instituting annual innovation awards in the field of cutting-edge sustainable tourism practices, biodiversity conservation, ecology conservation, rural tourism, agro-tourism, advanced and innovative technologies and practices in tourism, life sciences, renewable</li> </ul>	<ul style="list-style-type: none"> <li>• Celebrating World Tourism Day, World Wetland Day, National Science Day, World Forestry Day, World Water Day, World Meteorological Day, World Health Day, World Heritage Day. Also, the list includes Earth Day, World Environment Day, World</li> </ul>

<p>energy, innovative materials, environment, sustainable development, knowledge-based green economy, alternative thinking, driving positive change in the society and sustainability</p> <ul style="list-style-type: none"> <li>• Conducting training on sustainable tourism activity, enhanced productivity and better realisation to the rural community</li> <li>• Conducting conferences, seminars, workshops, training programmes, cultural and social functions and other events pertinent to tourism, research and innovation and environmental awareness</li> <li>• Conducting Corporate Social Responsibility programs jointly with industry partners and corporate in the field of awareness creation in sustainable tourism, rural technologies, water usage, biodiversity conservation, tourism pollution, occupational health, tourism safety, environment, health, education and other societal issues</li> </ul>	<p>Population Day, World Ozone Day, and Green Consumer Day. Apart, other days include World Habitat Day, World Wildlife Week, World Animal Welfare Day, International Day for Natural Disaster Reduction</p> <ul style="list-style-type: none"> <li>• Regular youth development programs</li> <li>• Development programs for the local skillset</li> <li>• Conducting cultural events and other events on a regular basis keeping the entire community in focus</li> <li>• Education exchange programs with other countries, collaborating institutions, and universities</li> <li>• Organising exchange of visits by scholars, eminent personalities, university, research institutes, industry experts, innovation award winners, a young scientist, young entrepreneur, women entrepreneur, research patent owners</li> </ul>
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*Source: MACE analysis*



## Chapter - 19

# Implementation schedule and micro level action plan

### 19.1. Implementation and monitoring mechanism

To realise the vision of the SE-TP and implement the project within the envisaged period, a conscious effort is required. The project involves coordination with various agencies. The master planning and feasibility study include the development of the implementation schedule. The implementation schedule dwells in detail on activities covering investment decision, strategic partners/co-developers selection, EPC and O&M contractors selection, finalising a partnership with various agencies, financial closure, concession agreement, tendering, & award of the contract, statutory approval, external linkages and connectivity, design and detailed engineering, execution, organisation, marketing of space.

**Table No. 15.2 and 15.3** provides the implementation activities of SE-TP.

The exercise includes identification of major development activities, associated timelines, and the implementation schedule from the perspective of SE-TP:PIU, SE-TP:SPV and TKZC:SPV. As a part of the implementation plan, the key intervention required by various agencies involved in the development process for achieving the desired objective.

The monitoring mechanism shall include identification of key elements for ensuring success from a management structure perspective, statutory standards to be maintained, adherence to sustainability concepts.

Further, the activities include an in-depth analysis of various bidding and contract structure and recommendation of appropriate location-specific project/contract structure along with merit and demerit analysis. The activities also include monitoring of concessionaire performance, delivery standards, statutory and regulatory compliance, and measures for monitoring marketing, benchmarking performance, and stipulating performance standards.

**Exhibit No. 19.1** outlines the summary of the action plan for the implementation of the SE-TP.

The total period for implementation of the SE-TP connectivity and external infrastructure is estimated to be 24 months.

The total period for implementation of the SE-TP common infrastructure and TAF, TKZC and full completion of SE-TP is estimated to be 120 months, considering the phased manner of development. However, the occupant units of IRC shall commence commercial production from the third year of development onwards. Further, the tourist visitors can avail the facilities of SE-TP from 3<sup>rd</sup> year onwards.

Phase I development shall be carried out over an initial period of 2 years. The development of Phase II shall take place during 5<sup>th</sup> & 6<sup>th</sup> year, and Phase III development is contemplated on 9<sup>th</sup> year, and fully functional SE-TP including IRC-CoE&IDC shall commence from 10<sup>th</sup> year onwards.

Exhibit No. 19.1: Action plan for SE-TP including IRC-CoE&IDC

Project award	1	2	3	4
	Approval of the SE-TP MP&DP including budget	Specific project clearance and formation of SE-TP:PIU	Formation of tender committee comprising officials of the Government and other public sector agencies	Launching of Eco Sonadia
	5	6	7	8
	Brand building and media planning	Roadshows	Event management services	GTKES 2021
	9	10	11	12
	Preparation of Project Information Memorandum (PIM) for TAF and TKZC	Preparation of Notice Inviting Tender (NIT) / RFQs for TAF and TKZC	NIT floating, RFQ floating, receipt of response to RFQ and evaluation for TAF and TKZC	Preparation of bid documents - RFP and concession agreement for TAF and TKZC
	13	14	15	16
	RFP issue, receipt of financial bid, evaluation for TAF and TKZC	Discussion, approval of the bid, issuance of letter of award and signing of concession agreement for TAF and TKZC	Drafting implementation framework and forming SPVs	Organizational structuring and staffing for administration and management of SPVs

Project investigation, design and engineering	1	2	3
	Site investigations, surveys, field investigations for SE-TP common infrastructure	Site investigations, surveys, field investigations for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP	Design and detailed engineering plan for SE-TP common infrastructure
	4	5	6
	Design and detailed engineering plan for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP	BoQ and detailed project costing for SE-TP common infrastructure	BoQ and detailed project costing for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP

Project financial closure	1	2	3	
	Securing loan from MFI / other FIs	Mobilizing Government contribution, equity through PPP and term loan for PPP projects	Achieving financial closure of SE-TP:PIU	
	4	5	6	7
	Achieving financial closure of TKZC:SPV	Drafting project promotion strategy and preparation of marketing collaterals of SE-TP	Project promotional activities - Investor meets, B2B meets etc. of SE-TP	Country partnership, research institutions and foreign institutions/technology suppliers /marketing agency/innovative technology & know how supplier - Tie up
	8	9	10	
	Signing of contract with occupant units of IRC-CoE&IDC	Statutory application submission and ESIA approval process for SE-TP including activities of IRC-CoE&IDC	Procuring statutory approvals for construction (land clearance, environmental clearance) and obtaining "Consent for development" from statutory authorities for SE-TP	

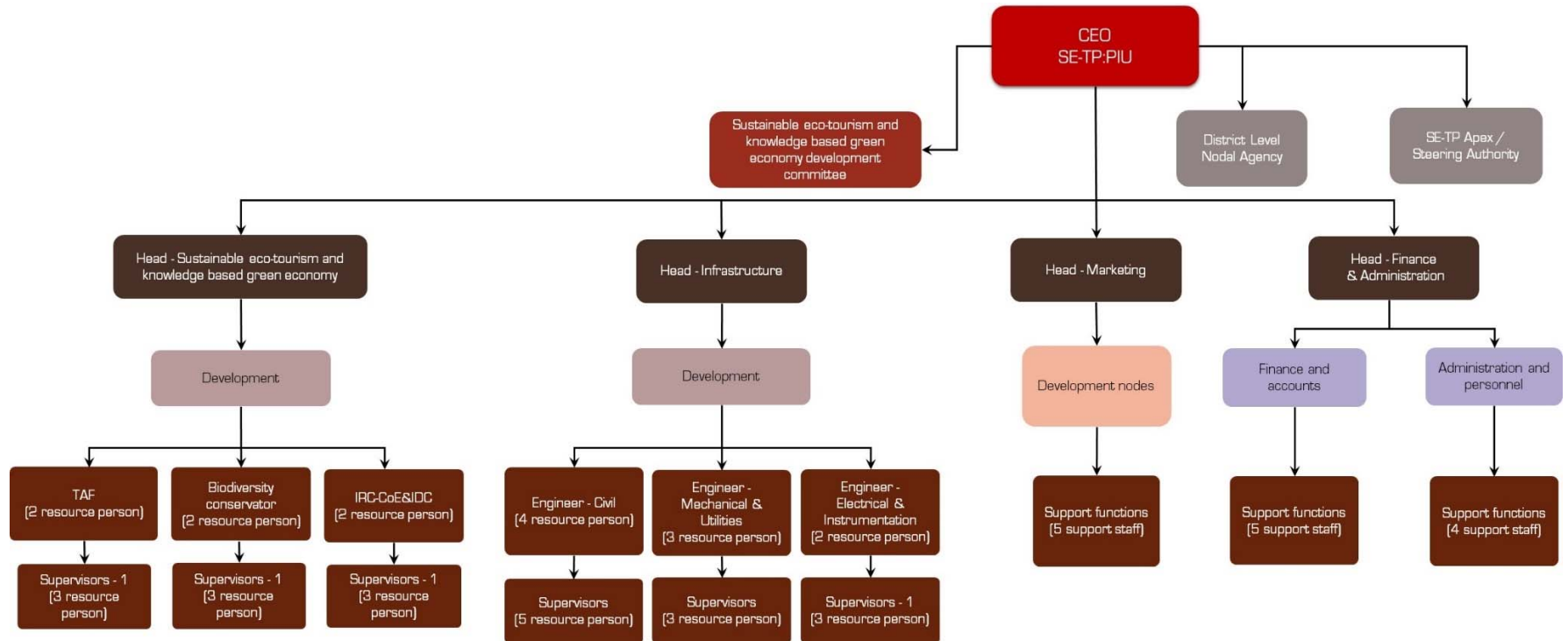
Project execution	1	Action plan and execution of SE-TP connectivity and external infrastructure	2	Contract packaging for SE-TP common infrastructure	3	Contract packaging for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP	4	Contract packaging for SE-TP tourism infrastructure
	5	Tendering and empanelment of vendors for SE-TP common infrastructure	6	Tendering and empanelment of vendors for TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-	7	Tendering and empanelment of vendors for SE-TP tourism infrastructure	8	Selection of vendors and signing of contract for SE-TP common infrastructure
	9	Selection of vendors and signing of contract for TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-TP	10	Selection of vendors and signing of contract for SE-TP tourism infrastructure	11	Bid floating, contract finalization for TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-TP	12	ESIA implementation
	13	Completion of SE-TP common infrastructure	14	Completion of TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-TP	15	Completion of SE-TP tourism infrastructure	16	Construction phase for occupant units of IRC-CoE&IDC
	17	Completion of external linkages and connectivity for SE-TP						

Project commissioning	1	Obtaining "Consent for Operation" from statutory authorities for SE-TP	2	Obtaining "Consent for Operation" from statutory authorities for TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-TP	3	Procuring statutory approvals for commencement of operation of TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-TP	4	Testing, commissioning and system integration of TAF and TKZC development and common infrastructure, specialized tourism infrastructure within SE-TP
	5	Occupant units of IRC-CoE&IDC pre commissioning activities	6	Statutory approval for occupant units of IRC-CoE&IDC	7	Obtaining "Consent for Operation" from statutory authorities for occupant units of IRC-CoE&IDC	8	Commencement of tourism activities within SE-TP
	9	Occupant units of IRC-CoE&IDC commercial production commencement						

Source: MACE analysis

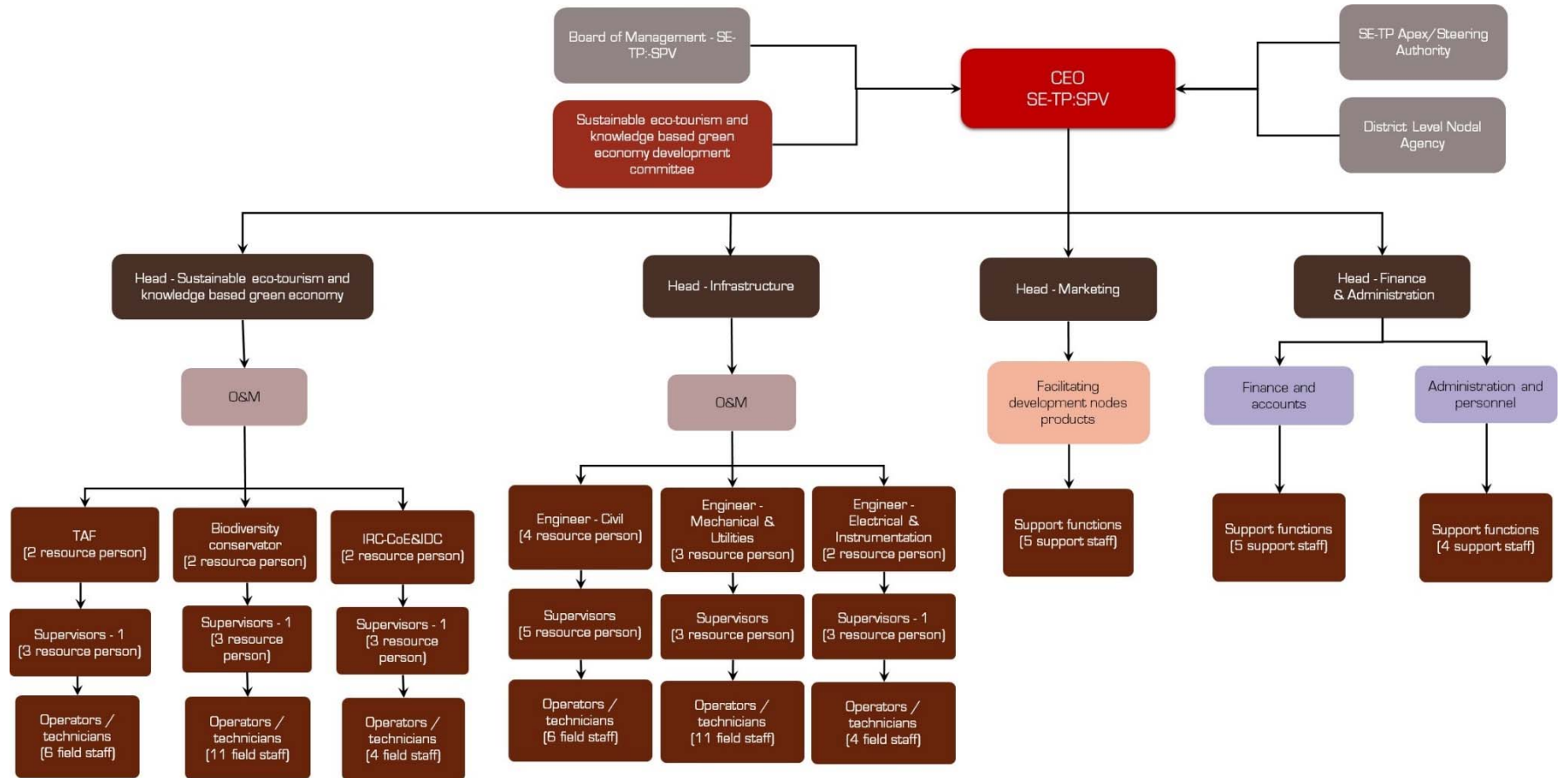
Exhibit No. 19.2 to 19.4 highlights the organisation proposed for SE-TP:PIU, SE-TP:SPV and TKZC:SPV.

Exhibit No. 19.2: Organisation chart for SE-TP:PIU



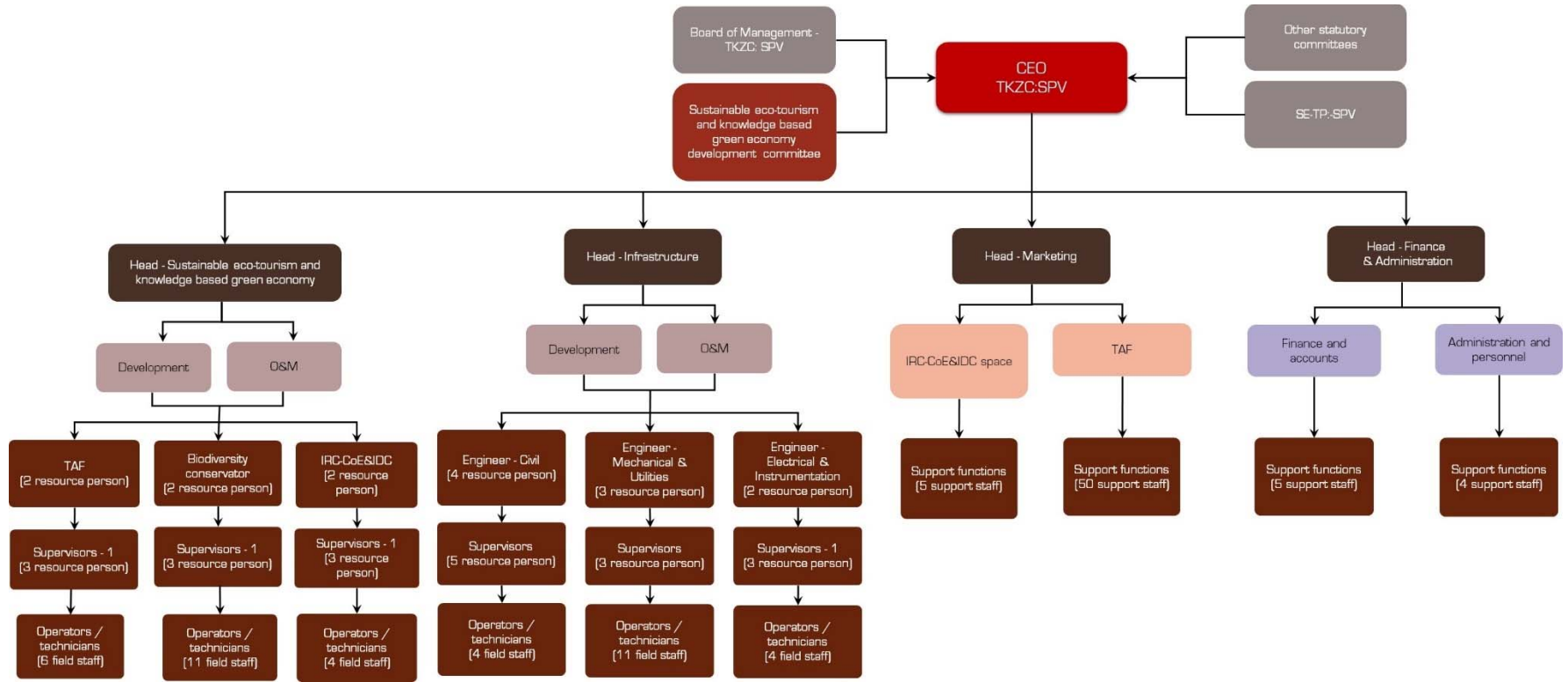
Source: MACE analysis

Exhibit No. 19.3: Organisation chart for SE-TP:SPV



Source: MACE analysis

Exhibit No. 19.4: Organisation chart for TKZC:SPV



Source: MACE analysis

## 19.2. Phasing

According to the demand of consultation meeting and potentiality of the area, development is proposed in a phased manner. The list of development projects with appropriate phasing is provided in **Table No. 19.1**.

**Table No. 19.1: Priority projects of SE-TP**

Sl. No.	Components	Phase I		Phase II		Phase III
		Year 1	Year 2	Year 5	Year 6	Year 9
<b>I</b>	<b>Sonadia Island tourism facilitation development</b>					
a	Embankment					
b	Site grading					
c	Road connecting zones					
<b>II</b>	<b>Zones and components</b>					
<b>1</b>	<b>Entrance zone</b>					
a	Internal road / path					
b	E-car and cycle parking					
c	Information kiosk/globe					
d	Helipad					
e	Viewing deck					
f	Water pool with musical fountains					
g	Green / landscape					
h	Jetty					
<b>2</b>	<b>Heritage and hospitality zone</b>					
a	Pavilion					
b	Arts & craft village					
i	<i>Themed pavilion</i>					
ii	<i>Internal road / path</i>					
iii	<i>Green / landscape</i>					
c	Star hotel					
i	<i>Building</i>					
ii	<i>Internal road / path</i>					
iii	<i>Green / landscape</i>					
d	Business & relaxation					
i	<i>Statue deck</i>					
ii	<i>Heritage pavilion</i>					
iii	<i>Convention centre and MICE</i>					
iv	<i>Budget hotel</i>					
v	<i>Yoga centre and meditation hall</i>					
vi	<i>Resorts and multi-cuisine restaurant</i>					
vii	<i>Water pool</i>					
viii	<i>Green / landscape</i>					
ix	<i>Internal road / path</i>					
<b>3</b>	<b>Knowledge centre zone</b>					
a	IRC-CoE&IDC					
b	Internal road / path					
c	Green / landscape					
d	Golf course					

Sl. No.	Components	Phase I		Phase II		Phase III
		Year 1	Year 2	Year 5	Year 6	Year 9
e	Clubhouse					
f	Kiosk					
g	Cottages					
<b>4</b>	<b>Family entertainment zone</b>					
a	Botanical Garden					
i	<i>Greenhouses and agro-tourism</i>					
ii	<i>Butterfly park</i>					
iii	<i>Public square</i>					
iv	<i>Internal road / path</i>					
v	<i>Green sculptures and eco-bridge</i>					
vi	<i>Green / landscape</i>					
vii	<i>Multi-cuisine restaurant</i>					
b	Villas					
c	Open garden					
<b>5</b>	<b>Adventure zone</b>					
a	Dry rides and other adventure activity					
b	Wet rides and other adventure activity					
<b>6</b>	<b>Eco-science zone</b>					
a	Oceanarium					
b	Marine biology research centre					
c	Internal road / path					
d	Wooden deck					
e	Water pool					
f	Amphitheatre					
g	Green and organic cultivation					
h	Wooden walkway					
i	Eco-tents					
j	Sky bridge					
k	Green / landscape					
<b>III</b>	<b>Amenity buildings</b>					
a	Administration building					
b	Training /skill development centre					
c	Primary health centre					
d	Disaster management centre					
e	Fire station					
f	Police station					
<b>IV</b>	<b>Utility structures</b>					
a	Internal water distribution network (Potable & Non-potable)					
b	Water treatment plant including utility structures					
c	Water utility structures (GLSR, ELSR & pump house)					
d	Internal power distribution line					
e	Street light					
f	Distribution transformers					
g	Internal sewerage network					
h	Sewerage treatment plant					



Sl. No.	Components	Phase I		Phase II		Phase III
		Year 1	Year 2	Year 5	Year 6	Year 9
i	Internal drain network and rainwater harvesting					
j	Internal telecom network					
k	Solid waste management plant					
<b>V</b>	<b>Off-site infrastructures</b>					
a	Access road (10 m wide)					
b	Power supply incoming line					
c	Sub-station 33/11 kV					
d	Water supply					

*Source: MACE analysis*

19.3. Implementation schedule

Exhibit No. 19.5 presents the timetable for implementation factoring these stages.

Exhibit No. 19.5: Micro-level action plan

Stage	Activity	Phase I												Phase II												Phase III																	
		Year 1						Year 2						Year 5						Year 6						Year 10																	
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12						
I	<b>Project award</b>																																										
1.1	Approval of the SE-TP MP&DP including budget	█																																									
1.2	Specific project clearance and formation of SE-TP:PIU	█																																									
1.3	Formation of tender committee comprising officials of the Government and other public sector agencies	█	█																																								
1.4	Launching of Ecotour Sonadia	█																																									
1.5	Brand building and media planning	█	█																																								
1.6	Roadshows	█	█	█																																							
1.7	Event management services	█	█	█																																							
1.8	GTKES 2021	█	█	█																																							
1.9	Preparation of Project Information Memorandum (PIM) for TAF and TKZC	█	█	█																																							
1.10	Preparation of Notice Inviting Tender (NIT) / RFQs for TAF and TKZC	█	█	█																																							
1.11	NIT floating, RFQ floating, receipt of response to RFQ and evaluation for TAF and TKZC	█	█	█																																							
1.12	Preparation of bid documents - RFP and concession agreement for TAF and TKZC	█	█	█																																							
1.13	RFP issue, receipt of financial bid, evaluation for TAF and TKZC	█	█	█																																							
1.14	Discussion, approval of the bid, issuance of letter of award and signing of concession agreement for TAF and TKZC	█	█	█																																							
1.15	Drafting implementation framework and forming SPVs	█	█	█																																							
1.16	Organisational structuring and staffing for administration and management of SPVs	█	█	█																																							
II	<b>Project investigation, design and engineering</b>																																										
2.1	Site investigations, surveys, field investigations for SE-TP common infrastructure	█	█	█																																							
2.2	Site investigations, surveys, field investigations for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP	█	█	█																																							
2.3	Design and detailed engineering plan for SE-TP common infrastructure	█	█	█																																							

Stage	Activity	Phase I												Phase II												Phase III											
		Year 1						Year 2						Year 5						Year 6						Year 10											
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
2.4	Design and detailed engineering plan for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP																																				
2.5	BoQ and detailed project costing for SE-TP common infrastructure																																				
2.6	BoQ and detailed project costing for TAF and TKZC development and common infrastructure, specialised tourism																																				
III	<b>Project financial closure</b>																																				
3.1	Securing loan from MFI/other FIs																																				
3.2	Mobilizing Government contribution, equity through PPP and term loan for PPP projects																																				
3.3	Achieving financial closure of SE-TP:PIU																																				
3.4	Achieving financial closure of TKZC:SPV																																				
3.5	Drafting project promotion strategy and preparation of marketing collaterals of SE-TP																																				
3.6	Project promotional activities - Investor meets, B2B meets etc. of SE-TP																																				
3.7	Country partnership, research institutions and foreign institutions/technology suppliers/marketing agency/innovative technology & know how supplier – Tie up																																				
3.8	Signing of contract with occupant industries of IRC-CoE&IDC																																				
3.9	Statutory application submission and ESIA approval process for SE-TP including activities of IRC-CoE&IDC																																				
3.10	Procuring statutory approvals for construction (land clearance, environmental clearance) and obtaining "Consent for development" from statutory authorities for																																				
IV	<b>Project execution</b>																																				
4.1	Action plan and execution of SE-TP connectivity and external infrastructure																																				
4.2	Contract packaging for SE-TP common infrastructure																																				
4.3	Contract packaging for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-																																				
4.4	Contract packaging for SE-TP tourism infrastructure																																				

Stage	Activity	Phase I												Phase II												Phase III											
		Year 1						Year 2						Year 5						Year 6						Year 10											
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
4.5	Tendering and empanelment of vendors for SE-TP common infrastructure																																				
4.6	Tendering and empanelment of vendors for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP																																				
4.7	Tendering and empanelment of vendors for SE-TP tourism infrastructure																																				
4.8	Selection of vendors and signing of contract for SE-TP common infrastructure																																				
4.9	Selection of vendors and signing of contract for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP																																				
4.10	Selection of vendors and signing of contract for SE-TP tourism infrastructure																																				
4.11	Bid floating, contract finalisation for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP																																				
<b>4.12</b>	<b>ESIA implementation</b>																																				
(a)	Implementation of resettlement activity for people																																				
(b)	Livelihood restoration for resettle people																																				
(c)	Implementation of ESIA mitigation measures																																				
4.13	Completion of SE-TP common infrastructure																																				
4.14	Completion of TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP																																				
4.15	Completion of SE-TP tourism infrastructure																																				
4.16	Construction phase for occupant units of IRC-CoE&IDC																																				
<b>4.17</b>	<b>Completion of external linkages and connectivity for SE-TP</b>																																				
(a)	Main Road and other access roads, cross drainage, culverts, bridges etc.																																				
(b)	Electricity supply																																				
(c)	Telecommunication and other linkages																																				
<b>V</b>	<b>Project commissioning</b>																																				
5.1	Obtaining "Consent for Operation" from statutory authorities for SE-TP																																				
5.2	Obtaining "Consent for Operation" from statutory authorities for TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-																																				

Stage	Activity	Phase I												Phase II												Phase III														
		Year 1						Year 2						Year 5						Year 6						Year 10														
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12			
5.3	Procuring statutory approvals for commencement of operation of TAF and TKZC development and common infrastructure, specialised tourism																																							
5.4	Testing, commissioning and system integration of TAF and TKZC development and common infrastructure, specialised tourism infrastructure within SE-TP																																							
5.5	Occupant units of IRC-CoE&IDC pre commissioning activities																																							
5.6	Statutory approval for occupant units of IRC-CoE&IDC																																							
5.7	Obtaining "Consent for Operation" from statutory authorities for occupant units of IRC-CoE&IDC																																							
5.8	Commencement of tourism activities within SE-TP																																							
5.9	Occupant units of IRC-CoE&IDC commercial production commencement																																							

Source: MACE analysis

## Chapter - 20

# Risk mapping, analysis and mitigation strategies

### 20.1. The generalised approach towards risk management

SE-TP has many characteristics that make it especially valuable as an agent for development. As a cross-cutting sector, SE-TP stimulates productive capacities from trade and the provision of jobs linked to the tourism value chain. In particular, SE-TP thrives on assets, such as the natural environment, a warm climate, rich cultural heritage and plentiful human resources, and thus providing a comparative advantage. However, SE-TP can also be a source of environmental damage and pollution, a heavy user

of scarce resources and a cause of negative change in society. For these reasons, it is imperative for SE-TP to be well planned and managed, embracing the principles of sustainable tourism, defined as “tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities”.

**Exhibit No. 20.1** depicts the generalised approach towards risk management in developing SE-TP with private sector investment.

#### Exhibit No. 20.1: Risk and mitigation strategies

##### Tourism sector constraints

- Evolving conducive policy framework and innovative mitigation tools

##### Concept promotion and acceptance

- Need to remove the apprehensions of research and innovation company investors on clustering of competitors
- Extensive stakeholder consultation across the to create awareness, eradicate apprehensions engulfing their minds and instil confidence

##### Eco-conservation of development zones and preservation of bio diversity

- GIS and innovative planning tools
- Transparent development approach and research space allotment
- No negative disturbance to rural living, for natural habitat and identified endangered species

##### Government related issues and approval process

- Sustainable development of eco-tourism policy to be in place
- High important sector for promoting knowledge based green economy growth
- Transparent approval process in developer selection of TKZC (in PPP mode option) and built up space of TKZC – full adherence requirement

##### Developed built up space off take of research and innovation centre

- Multi-pronged approach
- Anchor clients
- Phased development
- Roadshows and B<sub>2</sub>B meeting

##### Sustained development of tourism sector

- Whole family infotainment
- Promotion of agro and rural tourism
- Increasing capacity building of tourism value chain actors
- Adherence to the principles of sustainable eco-tourism

##### Environmental and implementation

- Favorable sector
- Huge emphasis on environmental infrastructure and green practices and eco conservationWell-structured team for development, operation and maintenance
- Well-structured team for development, operation and maintenance

*Source: MACE analysis*

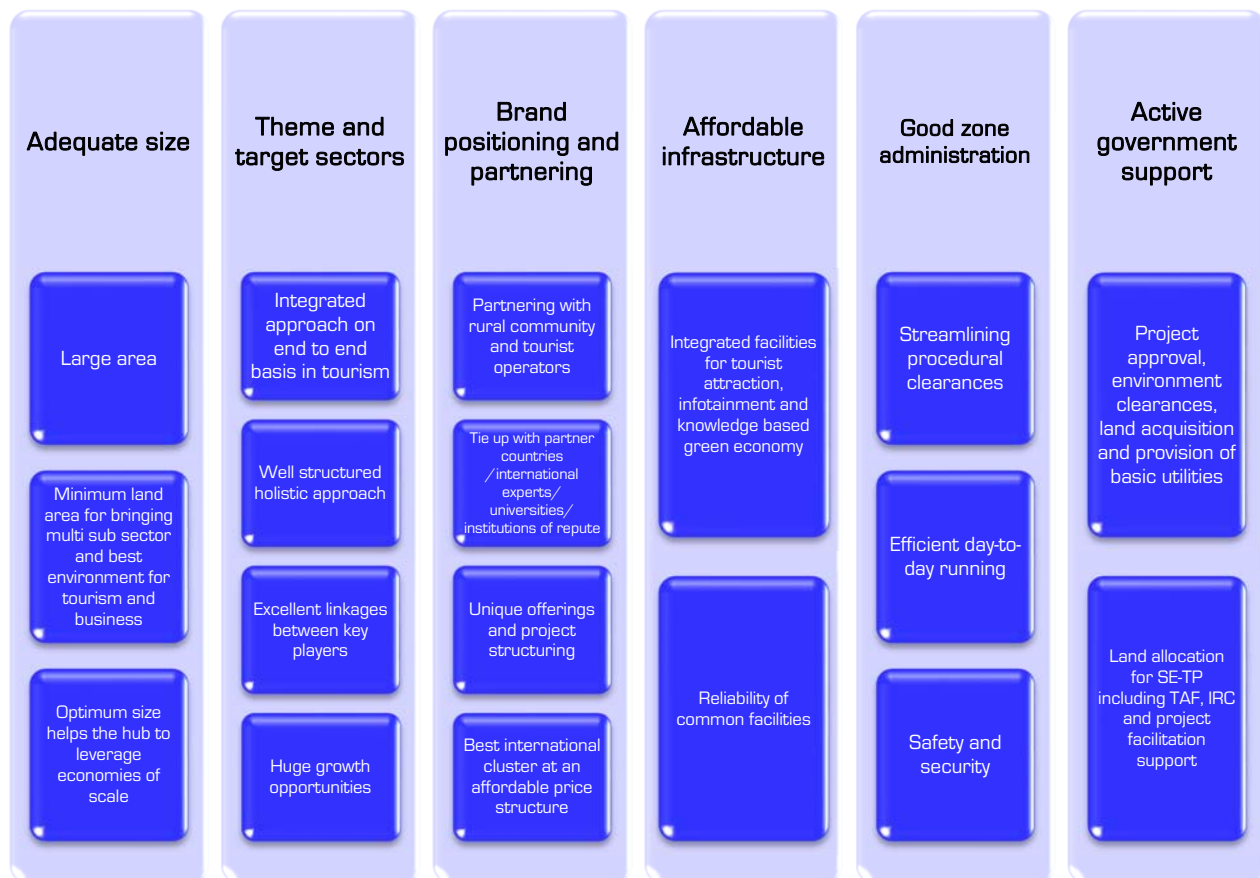
## 20.2. Critical success factors for SE-TP

A fundamental characteristic of the SE-TP is its ability to link the economic, social, cultural and environmental aspects of sustainability and to act as a driving force for their mutual enhancement. This is because SE-TP, as an economic activity, is highly dependent on the presence of intact environments, rich cultures, and welcoming host communities. The opportunity that SE-TP brings to deliver income and jobs from cultural experiences is just one example of this. In turn, this places a heavy responsibility on the SE-TP to address the social, cultural and environmental impacts of its own developments and operations. Bangladesh's varied ecological zones, knowledgebase, abundant raw material resources, unlimited opportunities in the eco-tourism have the potential to bestow significant benefits on tourist, tourism sector

companies and value chain actors, government, rural community, people and the environment. The decision to establish SE-TP in Bangladesh is primarily an expression of the ambition to drive all such benefits from the country's ecosystem to the tourism sector stakeholders, including rural communities. Poverty reduction, social inclusion and creation of large-scale employment through SE-TP requires commitment from GoB and the private sector with relevant policies and tools, such as value chain analysis, to determine which interventions can best take place to support poor communities.

**Exhibit No. 20.2** presents the analysis and findings based on the critical factors required for the success of the proposed SE-TP regarding adequate size, brand positioning, and collaborating, administration, Government of Bangladesh support.

**Exhibit No. 20.2: SE-TP - critical success factors**



*Source: MACE analysis*

### 20.3. Need for multi-criteria analysis for risk assessment and risk assessment methodology

Many business and non-business factors, external and internal influence factors may have a significant impact on SE-TP. Hence, there is a need to develop a multi-criteria assessment model for risk evaluation. The study includes the development of a risk matrix in the context of SE-TP using a structured approach through two different types of procedures.

The first method maps the qualitative assessment of risk associated with the volume, value, cost, growth, governance, brand perspectives against various parameters like internal, partners, customer, competition and PESTEL. These are discussed in the context of SE-TP:PIU, TKZC:SPV, TKZC developer, occupant units of TKZC, and business agencies associated with SE-TP operations. [Table No. 20.1](#) presents the mapping of the impact of the risk and likely occurrence against each risk.

**Table No. 20.1: Risk matrix**

Description	Internal	Partners	Customer	Competition	TEMPLES
Volume, value, cost, growth, governance, brand					
The potential impact on the success of SE-TP					
Likelihood of occurrence					

*Source: MACE analysis*

Types of risk during the project implementation stage are significantly different from those risks faced during the operation stage. Thus, in the second approach, risk assessment of SE-TP development under two stages viz., implementation stage and operation stage are carried out.

The second method includes the quantitative risk analysis regarding strategic orientation, customer orientation, project delivery and execution risk, triple bottom line sensitivity, human dimension and economic dimension.

The study includes a designation in a numeric alpha mode for the risk assessment score in the second approach. A scale of 1 to 5

represents the implementation stage risk, with 1 indicating the lowest risk. On the other hand, a scale of A to E indicates the post-implementation stage with A indicating the lowest risk. A combination of the two would give a two-dimension matrix as an output. Thus, in a comprehensive manner of risk assessment, 1A would indicate the lowest risk and 5E the highest.

Risk assessment, impact analysis and mitigation strategies based on both approaches are presented in [Annexure-20A](#).

[Table No. 20.2](#) and [Exhibit No. 20.3](#) shows the composite risk assessment score during implementation based on the analysis of indicators and sub-indicators considerations.

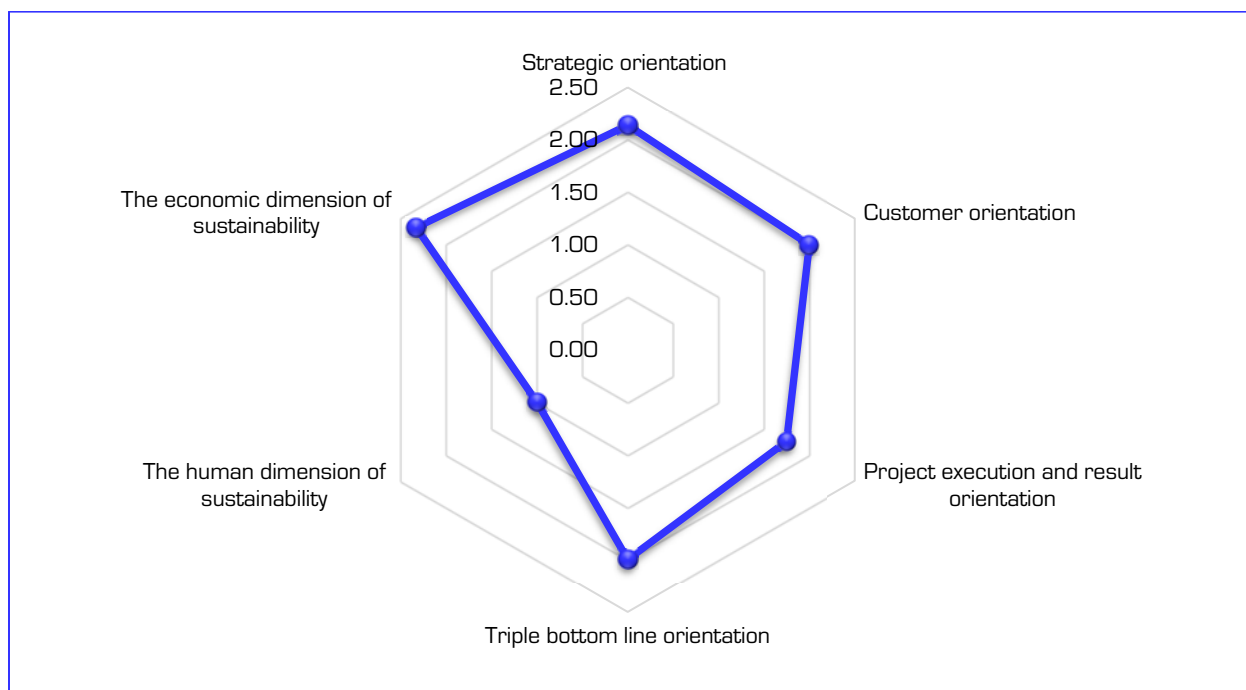
**Table No. 20.2: Composite risk assessment score during implementation stage**

S. No.	Risk assessment during implementation	SE-TP risk assessment score in a band of 1 to 5
1	Strategic orientation	2.14
2	Customer orientation	2.00
3	Project execution and result orientation	1.75
4	Triple bottom line orientation	2.00
5	The human dimension of sustainability	1.00
6	The economic dimension of sustainability	2.33
	<b>Composite risk assessment score during implementation stage</b>	<b>1.87</b>

*Source: MACE analysis*



Exhibit No. 20.3: SE-TP risk assessment matrix during implementation in a 1 to 5 band



Source: MACE analysis

Table No. 20.3 presents the composite risk assessment score during operation stage based on the analysis of indicators and sub-indicators considerations.

Table No. 20.3: Composite risk assessment score during operation stage

S. No.	Risk assessment during operation	SE-TP risk assessment score in a band of A to E
1	Strategic orientation	B
2	Customer orientation	B
3	Operation and result orientation	B
4	Triple bottom line orientation	B
5	The human dimension of sustainability	B
6	The economic dimension of sustainability	B
	<b>Composite risk assessment score during operation stage, based on the number of occurrences</b>	<b>B</b>

Source: MACE analysis

#### 20.4. Combined risk assessment score

Table No. 20.4 presents the combined risk assessment score for SE-TP.

Table No. 20.4: Composite risk assessment score

Risk assessment	SE-TP Rating	Remarks
Risk assessment during the implementation period	1.87	In a band of 1 to 5

Risk assessment	SE-TP Rating	Remarks
		Level 1 indicates low risk whereas 5 indicates an extreme risk
Risk assessment during the operation period	B	In a band of A to E Level A indicates low risk whereas E indicates an extreme risk
<b>Combined risk assessment score</b>	<b>1.87 B</b>	1 A indicates low risk whereas 5 E indicates extreme risk on a combined assessment

*Source: MACE analysis*

## 20.5. Five force analysis

Michael Porter (1980; 1985) suggested the five forces model determine the attractiveness of an industry and construct a sustainable competitive position for the firm among competitors. This model captures the main gist of Porter's theory of sustainable competitive advantage in that it emphasises the five forces defining the rules of competition within a market. The following provides the five competitive forces affecting industry attractiveness.

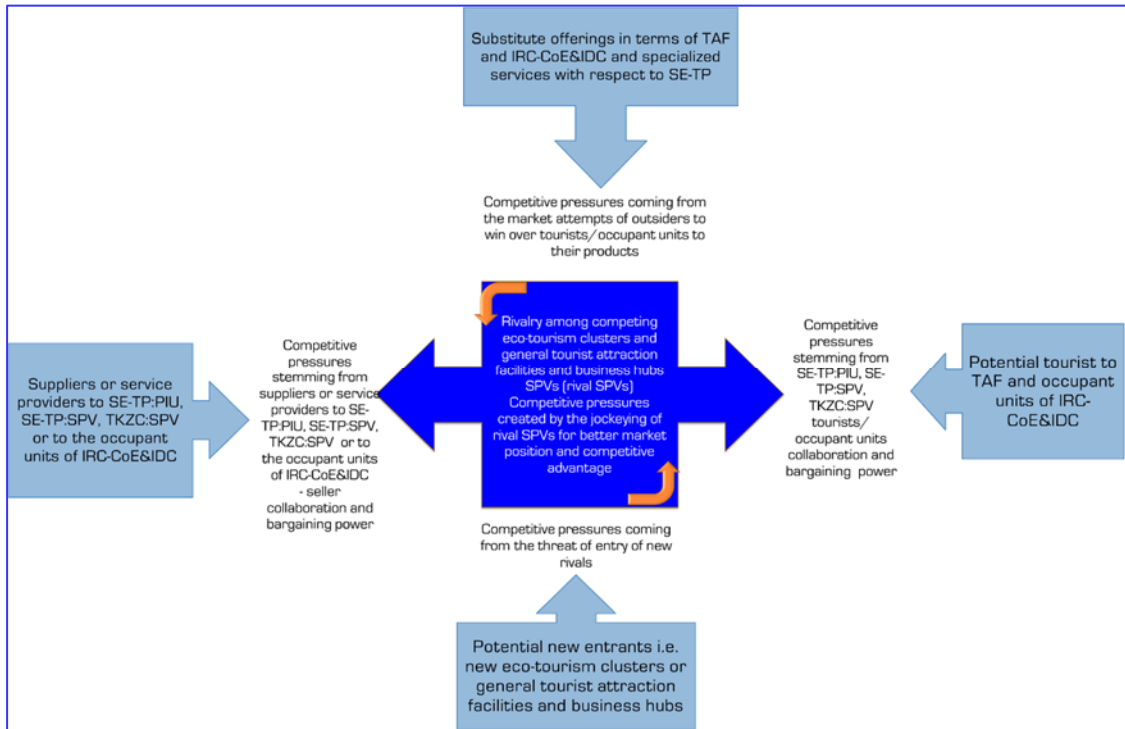
1. Competitive pressures stemming from the **buyer** bargaining power;
2. Competitive pressures are coming from companies in other industries to win buyers over to **substitute products**;
3. Competitive pressures stemming from the **supplier** bargaining power;
4. Competitive pressures associated with the threat of **new entrants** into the market; and

5. Competitive pressures associated with **rivalry among competing sellers** to attract customers. This particular factor is usually the strongest of the five competitive.

To be competitive, SE-TP needs to be integrated into a country's overall tourism and knowledge-based green economy strategies. To be sustainable, the impact of SE-TP needs to be measured and monitored, and a reliable system of national tourism statistics needs to be developed. At the same time, investments should directly link to the rural community, tourism operators, local SMEs, and improve synergies between SE-TP and other sectors such as agriculture, life sciences, health care and creative industries, if tourism is to be a driving force for sustainable development.

**Exhibit No. 20.4** presents the approach towards analysis of the five competitive forces affecting SE-TP:PIU, SE-TP:SPV and TKZC:SPV attractiveness based on the principles mentioned above.

Exhibit No. 20.4: Five forces analysis – SE-TP:PIU, SE-TP:SPV and TKZC:SPV



1. Competitive pressures stemming from SE-TP:PIU, SE-TP:SPV and TKZC:SPV-occupants collaboration and bargaining power ["*buyer*" - potential visitors / occupant units of SE-TP more specifically occupant units of TKZC] - Refer [Exhibit No. A.20A.1](#) in [Annexure-20A](#);
2. Competitive pressures are coming from the market attempts of outsiders to win over occupant units to their products ["*substitute products*" - substitute offerings regarding infrastructure and specialised services on SE-TP] - Refer [Exhibit No. A.20A.2](#) in [Annexure-20A](#);
3. Competitive pressures stemming from suppliers or service providers to SE-TP:PIU, SE-TP:SPV and TKZC:SPV or the occupant units of TKZC-seller collaboration and bargaining power ["*suppliers*" - suppliers or service providers to SE-TP:PIU, SE-TP:SPV and TKZC:SPV or the visitors / occupant units of SE-TP more specifically TKZC] - Refer [Exhibit No. A.20A.3](#) in [Annexure-20A](#);
4. Competitive pressures coming from the threat of entry of new rivals ["new entrants" - potential new entrants, i.e. new eco-tourism clusters or business hub] - Refer [Exhibit No. A.20A.4](#) in [Annexure-20A](#); and
5. Competitive pressures created by the jockeying of rival SPVs for better market position and competitive advantage. ["rivalry among competing sellers" - rivalry among competing for eco-tourism clusters and general TAF and business hubs SPVs (rival SPVs)"]
6. Competitive pressures created by the jockeying of rival SPVs for better market position and competitive advantage - Refer [Exhibit No. A.20A.5](#) in [Annexure-20A](#).

The analysis includes a designation in a numeric mode for the competitiveness assessment score of SE-TP:PIU, SE-TP:SPV and TKZC:SPV against various competitive pressures in addition to the five-force analysis. The analysis includes deployment on a scale of 1 to 5 for assessment of competitiveness, with 1 indicating the lowest competitiveness of SE-TP:PIU, SE-TP:SPV and TKZC:SPV against the concerned competitive pressure. It is evident that the lower the competitive pressure, the higher the

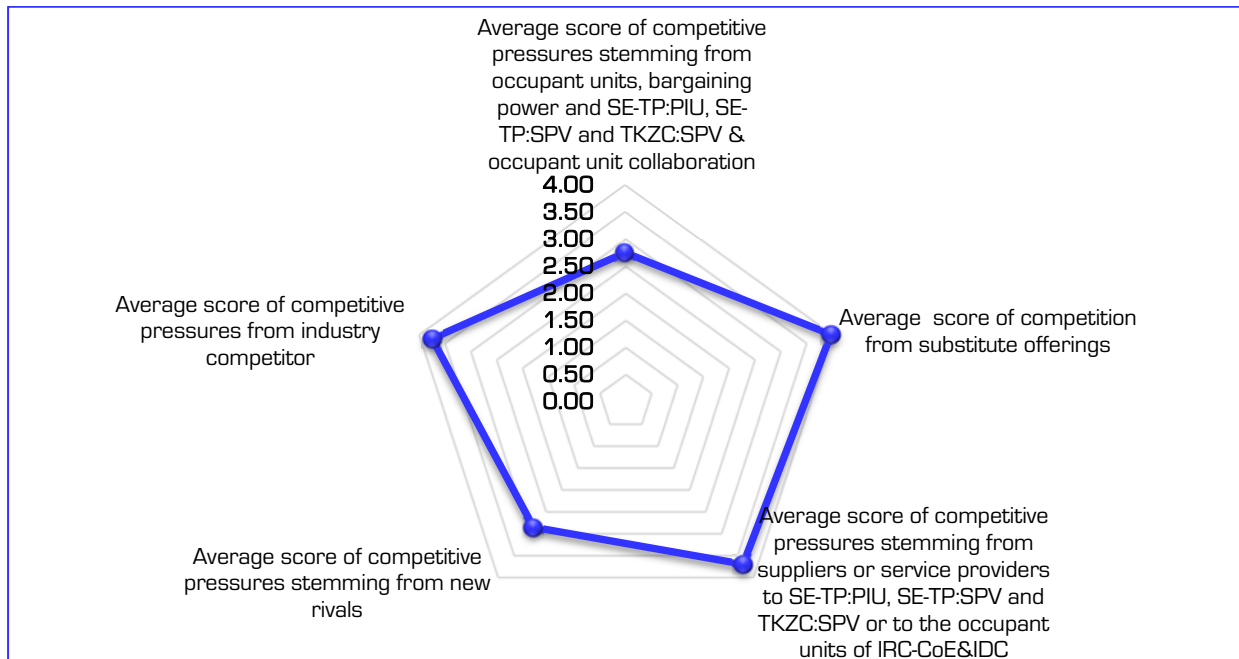
competitiveness for SE-TP and hence, the higher the score for SE-TP:PIU, SE-TP:SPV and TKZC:SPV.

Table No. 20.5 and Exhibit No. 20.5 outlines the composite competitiveness assessment score of SE-TP:PIU, SE-TP:SPV and TKZC:SPV based on the analysis of five forces considerations.

**Table No. 20.5: Composite competitiveness assessment score based on five forces analysis – SE-TP**

S. No.	Competitive force	Competitive assessment score in a 0-5 band (higher the competitiveness for SE-TP, higher the score for SE-TP:PIU, SE-TP:SPV and TKZC:SPV)
1	The average score of competitive pressures stemming from occupant units, bargaining power and SE-TP:PIU, SE-TP:SPV and TKZC:SPV & occupant unit collaboration	2.75
2	The average score of competition from substitute offerings	4.00
3	The average score of competitive pressures stemming from suppliers or service providers to SE-TP:PIU, SE-TP:SPV and TKZC:SPV or the occupant units of IRC-CoE&IDC	3.71
4	The average score of competitive pressures stemming from new rivals	2.88
5	The average score of competitive pressures from an industry competitor	3.75
<b>Total average competitiveness assessment score</b>		<b>3.42</b>

**Exhibit No. 20.5: SE-TP:PIU, SE-TP:SPV and TKZC:SPV competitiveness assessment matrix based on five forces analysis score**



Source: MACE analysis

# Benefits and contribution

### 21.1. SE-TP's overall objective

Tourism is one of the major sectors in international trade and one of the main wealth creators for many developing countries. Tourism means jobs, poverty eradication, gender equality, and the protection and promotion of natural and cultural heritage. Tourism has been identified by the UN as one of the ten sectors to drive the change towards a Green Economy and was included in the Rio +20 Outcome Document as one of the sectors capable of making “a significant contribution to the three dimensions of sustainable development, has close linkages to other sectors, and can create decent jobs and generate trade opportunities.”

Poverty reduction, social inclusion and creation of large-scale employment through SE-TP requires commitment from GoB and the private sector with relevant policies and tools, such as value chain analysis, to determine which interventions can best take place to support poor communities.

SE-TP contributes to the positioning of the GoB tourism sector within the overarching framework for action on green growth, poverty eradication and sustainable development.

SE-TP agenda is a broad one. It is as much about delivering economic benefits to destinations and communities, through competitive, viable tourism businesses that create employment, as about minimising adverse impacts on the environment.

As a labour-intensive sector, SE-TP offers opportunities for job creation for a range of skilled and low skilled labour, including women, youth and disadvantaged groups. SE-TP generates both direct and indirect employment and requires careful planning of human resources at all levels

to ensure a sufficient supply of suitably skilled labour to meet future growth.

SE-TP has proven to have a positive influence on poverty reduction. From supply chains to enterprise creation, a range of intervention points and mechanisms have been identified for increasing the proportion of tourism income that reaches and benefits the poor. To sustain the impact, a commitment from GoB and the private sector at all levels is needed to ensure that local stakeholders are consulted, engaged and empowered to influence decisions on tourism development and operations that may affect their livelihood, environment and communities.

SE-TP shall attract FDI for IRC-CoE&IDC, thus encouraging standard-setting and improving overall product quality. SE-TP through IRC-CoE&IDC initiative shall curtail the country's dependence on technology imports and meet a significant proportion of its knowledge-based green economy sector demand through domestic know-how and expertise. SE-TP, more particularly IRC-CoE&IDC shall provide the conducive infrastructure needed by knowledge workers. SE-TP shall incentivise cluster development and thus enhance benefits from technology transfer among MSMEs from sectors along the entire value chain.

SE-TP, including IRC-CoE&IDC, shall enjoy strategic importance in view of its role in developing the country's sustainable eco-tourism and knowledge-based green economy and inclusive growth.

### 21.2. Analysis of benefits and contribution

The benefits and the contribution of the proposed SE-TP, including IRC-CoE&IDC, are analysed both from the sector point of view and

sustainable eco-tourism and knowledge-based green economy contributor.

### 21.3. Benefits to sustainable eco-tourism and knowledge-based green economy contributors

The anticipated benefits to sustainable eco-tourism and knowledge-based green economy contributors are outlined in **Table No. 21.1**.

**Table No. 21.1: SE-TP including IRC-CoE&IDC - benefits to sustainable eco-tourism and knowledge-based green economy contributors**

Anticipated benefits	
Rural community	<ul style="list-style-type: none"> <li>o Exposure and familiarity with sustainable eco-tourism</li> <li>o Improved livelihood opportunities through extensive backward linkages</li> <li>o Enhanced rural income through capacity building and training and sustained business opportunities out of SE-TP initiative</li> <li>o Rural tourism opportunities and linking with SE-TP development and operation</li> <li>o Facilitating sustainable eco-tourism development at the grassroots level</li> <li>o Pro-poor business linkages in sustainable eco-tourism and SE-TP</li> <li>o Prevention of urban migration and displacement due to SE-TP initiative</li> <li>o Increasing value addition to rural products through SE-TP initiative</li> <li>o High unit value realisation from rural tourism model</li> <li>o Price stabilisation for rural products through business facilitation support</li> <li>o Rural growth and employment to the local population in the SE-TP development and operation</li> <li>o Better standard of living of the rural community</li> </ul>
Tourist operators	<ul style="list-style-type: none"> <li>o Development of bio-diversity-based tourism products</li> <li>o Enhanced business to tourist operators due to SE-TP including IRC-CoE&amp;IDC initiative</li> <li>o Eco-Tourism SME development</li> <li>o SE-TP alignment with domestic and international tourist requirements</li> <li>o Removing regulatory hurdles that have been affecting the growth through an appropriate SE-TP policy framework</li> <li>o Improved branding and marketing of tour operators</li> </ul>
Exporters of products of IRC-CoE&IDC	<ul style="list-style-type: none"> <li>o Leverage the growing demand in both domestic and international markets</li> <li>o Brand image for unique green products of Bangladesh and develop 'key products' to gain market dominance</li> <li>o New markets and new product lines and develop alternate marketing channels</li> <li>o The high realisation and value-added exports of IRC-CoE&amp;IDC products meeting EU, HACCP, FDA and other international standards</li> <li>o Improvement of market access through market intelligence</li> <li>o Competitive and efficient marketing arrangements</li> </ul>

*Source: MACE analysis and UNWTO*

### 21.4. Benefits to sector

Tourism is a key sector contributing to economic growth and the anticipated benefits to the sector are outlined in **Table No. 21.2**.

Table No. 21.2: SE-TP including IRC-CoE&amp;IDC – sector benefits and contribution

<p><b>Overall improvement to the tourism sector</b></p>	<ul style="list-style-type: none"> <li>○ Optimal use of environmental resources and conservation of biodiversity</li> <li>○ Meticulous efforts in maintaining essential ecological processes and conserving natural heritage and biodiversity</li> <li>○ Institutional strengthening and PPPs in sustainable eco-tourism in SE-TP</li> <li>○ Improvement of quality standards in sustainable eco-tourism services</li> <li>○ Facilitation of new product and services development and diversification in SE-TP</li> <li>○ Triggering of demand-driven business linkages due to SE-TP between agri-foods, creative Industries and service providers and the tourism Industry</li> <li>○ e-Tourism: fostering destination and sustainable eco-tourism SMEs competitiveness through an ICT-centric networking</li> <li>○ Creation of employment, decent work and human resources development arising of proactive measures of SE-TP</li> <li>○ Promotion of rural tourism &amp; agro-tourism and linking with SE-TP business model</li> <li>○ Ensuring the sustainability of the natural and cultural environment</li> <li>○ Promoting sustainable tourism governance</li> <li>○ Providing a safe, satisfying and fulfilling experience for domestic and foreign visitors, available to all without discrimination by gender, race, disability or in other ways</li> <li>○ Strengthened quality of life in local communities, including social structures and access to resources, amenities and life support systems, avoiding any form of social degradation or exploitation</li> <li>○ Enhancing the historic heritage, authentic culture, traditions and distinctiveness of Sonadia Island</li> <li>○ Enhanced consideration to the socio-cultural authenticity of host communities, conserving built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance</li> <li>○ Enhancing the quality of landscapes and avoiding the physical and visual degradation of the environment</li> <li>○ Supporting the conservation of natural areas, habitats and wildlife, and minimised damage to them</li> <li>○ Minimised use of scarce and non-renewable resources in the development and operation of SE-TP facilities and services</li> <li>○ Minimised level of pollution of air, water and land and minimised generation of waste by tourism enterprises and visitors.</li> <li>○ Meeting international sanitary &amp; hygiene standards and norms in tourism destination</li> </ul>
<p><b>Economic development and poverty reduction</b></p>	<ul style="list-style-type: none"> <li>○ Pro-poor growth in SE-TP</li> <li>○ Local economic development</li> <li>○ An additional source of foreign exchange earnings</li> <li>○ The prosperity of Sonadia Island and Cox's Bazar, including the proportion of visitor spending that is retained locally.</li> <li>○ Sustainable economic development option, with positive impacts on reducing poverty levels</li> <li>○ Economic and social benefits from SE-TP throughout the recipient community, including improving opportunities, income and services available to the poor.</li> </ul>
<p><b>Capacity building in the field of tourism</b></p>	<ul style="list-style-type: none"> <li>○ Capacity building in sustainable eco-tourism development and management including biodiversity conservation</li> </ul>

	<ul style="list-style-type: none"> <li>○ Capacity building of tourism officials, tourism-related institutions including GoB and GoB agencies</li> <li>○ Capacity building on sustainable eco-tourism marketing planning</li> <li>○ Capacity building on risk and crisis management and recovery techniques</li> <li>○ Supply capacity building and quality of products and services to meet market requirements</li> <li>○ Capacity building in hospitality, skills and sustainable eco-tourism business development</li> <li>○ Skills development, education and vocational training, on-the-job training and increase of the quality of services in SE-TP</li> <li>○ Capacity building on the deployment of indicators for sustainable eco-tourism</li> <li>○ Capacity building on climate change adaptation and mitigation in the context of sustainable eco-tourism</li> <li>○ Training for tour operators and guides on good practices in sensitive environments such as Sonadia Island</li> </ul>
<b>Market and linkages</b>	<ul style="list-style-type: none"> <li>○ Linkages among stakeholders such as farmers, rural communities, tour operators, hospitality industry, research and extension service providers</li> <li>○ Addressing the growing domestic and overseas tourism markets for better price realisation</li> <li>○ Access to capital, technology, effective management and support services such as credit, marketing, research and extension</li> <li>○ SE-TP holistically addresses supply chain alignment with domestic and international requirements, improvement of market access through market Intelligence</li> <li>○ Upstream and downstream effects on other economic activities on a very large and diversified supply chain</li> </ul>
<b>Occupant units of IRC-CoE&amp;IDC</b>	<ul style="list-style-type: none"> <li>○ Creation of a world-class best environment for business in the field of innovation and research</li> <li>○ SE-TP shall offer world-class facilities at an affordable cost structure</li> <li>○ The occupant's units of IRC-CoE&amp;IDC have the advantage of being able to avail the common infrastructure facilities, access to market intelligence, interact and conduct transactions at some of the world's leading institutions at a fraction of what it would have cost on standalone mode due to cluster benefits</li> <li>○ Excellent facility management in IRC-CoE&amp;IDC</li> <li>○ Induction of modern technology into the sustainable eco-tourism, knowledge-based green economy sector</li> </ul>
<b>Planning and infrastructure</b>	<ul style="list-style-type: none"> <li>○ Planned as a vibrant SE-TP including IRC-CoE&amp;IDC campus with state-of-the-art infrastructure</li> <li>○ The good lifestyle of integrated work – learn – play environment – self – contained eco-tourism and business hub with compatible social infrastructure facilities</li> <li>○ A great lifestyle and low cost– secure, friendly and stimulating environment</li> </ul>
<b>Institutional mechanism</b>	<ul style="list-style-type: none"> <li>○ SE-TP including IRC-CoE&amp;IDC aims to create an enabling institutional structure for addressing identified thrust areas, facilitates the flow of investment, technologies, skill sets and modern management practices</li> <li>○ SE-TP including IRC-CoE&amp;IDC aims to provide a mechanism to bring together farmers, rural communities, tour operators, and other tourism value chain actors and link rural communities to the market so as to ensure maximisation of value addition, minimisation of wastages and improving rural communities income</li> <li>○ Encouraging R&amp;D in emerging areas of the knowledge-based green economy</li> </ul>

*Source: MACE analysis and UNWTO*



## 21.5. Quantitative benefits

It is expected that SE-TP, including IRC-CoE&IDC development, will trigger 3500 direct employment across various levels and categories. The direct employment includes additional employment in the tourism sector, SE-TP common infrastructure including specialised tourism infrastructure, SE-TP connectivity and external infrastructure and TKZC common development including TAF and IRC-CoE&IDC and specialised tourism infrastructure within the TKZC boundaries.

The majority of these employment opportunities will be offered to the local communities after imparting the necessary skill through well-conceived skill development and capacity building programme. The study mapped the appropriate skill development and capacity building programme in the context.

Apart, from direct employment, the proposed initiative shall also trigger economic activity for 50000 people over the development and operation period. Indirect employment includes jobs generated viz. primary, secondary and tertiary sectors including tourism, travel, banks, logistics, insurance, manufacturing, trading, brokerage, ancillary industries, institutions, schools, colleges and other social infrastructure.

## 21.6. Alignment with vision 2041 and Delta plan of GoB

The SE-TP, along with IRC-CoE&IDC initiative, is in perfect congruence with the vision 2041, and Delta plan of GoB as revealed in [Exhibit No. 21.1](#).

### Exhibit No. 21.1: SE-TP including IRC-CoE&IDC congruence with vision 2041 and Delta plan

Zero poverty country

Sustainable agriculture to ensure food security and nutrition

Accelerated growth with industrialisation and trade

Strengthening competitive advantage

Employment challenge and strategies

Creating knowledge based and innovation economy

Digital opportunities and innovation

Moving from factor-driven stage to innovation-based economy

Human development-harnessing the demographic dividend





Managing the environment and climate change for sustainable growth





Addressing the challenges of coastal zones like cyclonic storms and tidal surges, floods, salinity, waterlogging, river bank and coastal erosion, fresh water scarcity, groundwater level decline







## 21.7. Alignment with UN SDGs

The SE-TP, along with IRC-CoE&IDC initiative, is also in perfect congruence with the UN SDGs as revealed in [Table No. 21.3](#).





**Table No. 21.3: SE-TP including IRC-CoE&IDC congruence with UN SDGs**





SDG goal	Project alignment with the goal	Score on a scale of 0-5
 <p>No poverty</p>	<ul style="list-style-type: none"> <li>Enhanced rural income through capacity building and training and sustained business opportunities out of SE-TP initiative;</li> <li>Sustainable eco-tourism is one of the largest and fastest-growing economic sectors in the world;</li> <li>SE-TP along IRC-CoE&amp;IDC initiative is well-positioned to foster economic growth and tourism and knowledge-based green economy development at all levels;</li> <li>SE-TP provides improved livelihood opportunities through extensive backward linkages;</li> <li>The initiative is poised to provide income through large scale job creation especially to the local and rural communities;</li> <li>Pro-poor business linkages in sustainable eco-tourism and SE-TP;</li> <li>Rural growth and employment to the local population in the SE-TP development and operation; and</li> <li>SE-TP along with IRC-CoE&amp;IDC development, and its impact at the community level is intertwined with GoB's poverty reduction goals and those related to promoting entrepreneurship and SMEs, and empowering less favoured and disadvantaged groups, particularly women and youth.</li> </ul>	<p>4.5</p> 
 <p>Zero hunger</p>	<ul style="list-style-type: none"> <li>SE-TP along IRC-CoE&amp;IDC can spur agriculture and allied sector productivity by promoting agrotourism and rural tourism and complement traditional agricultural activities;</li> <li>Further, the initiative can trigger production, use and sale of local produce in SE-TP and offer scope for its full integration in the sustainable eco-tourism value chain;</li> <li>Economic and social benefits from SE-TP throughout the recipient community, including improving opportunities, income and services available to the poor;</li> <li>IRC-CoE on life sciences focus on agricultural biotechnology like hybrid seeds, biopesticides plant extractions, transgenic plants and plant molecular biology is expected to contribute significantly to agriculture;</li> </ul>	<p>4</p> 







SDG goal	Project alignment with the goal	Score on a scale of 0-5
	<ul style="list-style-type: none"> <li>Also, the IRC-CoE research on aquaculture and marine biotechnology in the field of structural and functional genomics, marine pharmaceuticals, marine biomaterials, novel enzymes, biosensors, fish transgenic for therapeutics are expected to contribute towards zero hunger goal; and</li> <li>Enhanced rural communities income lead to more climate-resilient smart agriculture while enhancing the value of the tourism experience.</li> </ul>	
 <p>3 GOOD HEALTH AND WELL-BEING</p> <p>Good health and well-being</p>	<ul style="list-style-type: none"> <li>IRC-CoE focusing on life sciences covering health care and enzyme technology in the field of cancer biology, cardiovascular genetics, vascular biology, molecular virology, stem cells proliferation and vaccines/gene therapy/diagnostics is expected to contribute towards good health and well-being;</li> <li>SE-TP including IRC-CoE&amp;IDC contribution to economic growth and development can also have a knock-on effect on health and well-being apart from direct contribution to the goal; and</li> <li>Foreign earnings from international tourists and FDI in TAF and IRC-CoE&amp;IDC and tax income from SE-TP and tourism can be reinvested in healthcare and services, which should aim to improve maternal health, reduce child mortality and prevent diseases, among others.</li> </ul>	<p>3.5</p> 
 <p>4 QUALITY EDUCATION</p> <p>Quality education</p>	<ul style="list-style-type: none"> <li>SE-TP is conceptualised as an infotainment, edutainment facility;</li> <li>A well-trained and skilful workforce is crucial for sustainable eco-tourism to prosper;</li> <li>The SE-TP along with IRC-CoE&amp;IDC can provide incentives to invest in education and vocational training and assist labour mobility through cross-border agreements on qualifications, standards and certifications;</li> <li>SE-TP has the potential to promote inclusiveness particular youth, women, senior citizens, indigenous peoples and those with special needs;</li> <li>Capacity building in sustainable eco-tourism development and management including biodiversity conservation augment the education initiatives of GoB;</li> <li>Capacity building in hospitality, skills and sustainable eco-tourism business development also support education initiatives;</li> <li>Skills development, education and vocational training, on-the-job training planned in the SE-TP shall increase of the quality of services in SE-TP; and</li> <li>Thus SE-TP initiative benefit through educational means, the values of a culture of tolerance, peace</li> </ul>	<p>3.5</p> 

SDG goal	Project alignment with the goal	Score on a scale of 0-5
 <p>Gender equality</p>	<p>and non-violence, and all aspects of global exchange and citizenship.</p> <ul style="list-style-type: none"> <li>SE-TP initiative empowers women in multiple ways;</li> <li>The SE-TP initiative has several capacity-building components for encouraging women and integrating the disadvantaged group into the mainstream;</li> <li>Scope for provision of jobs and through income-generating opportunities in small and larger-scale tourism and hospitality-related enterprises;</li> <li>SE-TP initiative can have the highest share of women employed and entrepreneurs;</li> <li>SE-TP can be a tool for women to unlock their potential, helping them to become fully engaged and lead in every aspect of society.</li> </ul>	<p>4.5</p> 
 <p>Clean water and sanitation</p>	<ul style="list-style-type: none"> <li>SE-TP including IRC-CoE&amp;IDC is planned as “Sustainable-holistic-smart- intelligent-Eco-Tourism zone” and “Smart Intelligent-Eco-Campus” demonstrating the application and strategies for clean water and sanitation;</li> <li>IRC-CoE for environmental technologies and sustainable business practices focus on water and wastewater management and is expected to contribute significantly towards clean water and sanitation movement;</li> <li>SE-TP can play a critical role in achieving water access and security, as well as hygiene and sanitation for all;</li> <li>Training for tour operators and guides on good practices in sensitive environments such as Sonadia Island and clean sanitation; and</li> <li>The efficient use of water in the SE-TP, coupled with appropriate safety measures, wastewater management, pollution control and technology efficiency are coined.</li> </ul>	<p>4.5</p> 
 <p>Affordable and clean energy</p>	<ul style="list-style-type: none"> <li>The specific IRC-CoE focussing on alternative and renewable energy in the field of Solar PV, solar CSP, hydrogen energy, fuel cells, fuels from sunlight, electric and hybrid electric vehicles, geothermal energy and tidal energy, biomass utilisation, waste to energy technologies, batteries and energy storage, energy efficiency, and carbon capture and storage conceptualised in the study can provide necessary impetus for affordable and clean energy movement;</li> <li>SE-TP can help to reduce greenhouse gas emissions, mitigate climate change and contribute</li> </ul>	<p>4.5</p> 

SDG goal	Project alignment with the goal	Score on a scale of 0-5
	<p>to innovative and new energy solutions in urban, regional and remote areas; and</p> <ul style="list-style-type: none"> <li>SE-TP, including IRC-CoE energy requirements, is met through the substantial application of renewable energy applications.</li> </ul>	
 <p>Decent work and economic growth</p>	<ul style="list-style-type: none"> <li>Sustainable eco-tourism is one of the driving forces of global economic growth;</li> <li>By giving access to decent work opportunities in SE-TP, society – particularly youth and women – can benefit from increased skills and professional development;</li> <li>Improved branding and marketing of tour operators through SE-TP initiatives;</li> <li>Supply capacity building and quality of products and services to meet market requirements;</li> <li>Planned as a vibrant SE-TP including IRC-CoE&amp;IDC campus with state-of-the-art infrastructure;</li> <li>The good lifestyle of integrated work – learn – play environment – self – contained eco-tourism and business hub with compatible social infrastructure facilities;</li> <li>A great lifestyle and low cost– secure, friendly and stimulating environment;</li> <li>IRC-CoE&amp;IDC provide an intellectually stimulating environment through which professionals from academia, industry, incubators and research laboratories can collaborate on projects of business, government, societal, commercial and national significance; and</li> <li>IRC-IDC, as global design and engineering hub of international standards, is poised to attract a wide range of knowledge worker organisations.</li> </ul>	<p>4.5</p> 
 <p>Industry, innovation and infrastructure</p>	<ul style="list-style-type: none"> <li>SE-TP and IRC-CoE&amp;IDC will act as a platform to facilitate this engagement and collaboration with domain experts, stakeholders, key participants and shall lead the innovation movement in the field of tourism and knowledge-based green economy;</li> <li>The multiple CoEs as a part of SE-TP development focussing on research &amp; innovation activities on emerging areas of national interest;</li> <li>The focus of the IRC-CoE is on innovation and technology-led businesses that enhance Bangladesh competitive advantage and align with the economic, industrialisation, and knowledge development strategy;</li> <li>IRC-IDC facilitate design, engineering, technical, consulting, advisory &amp; research services;</li> <li>Bangladesh is well-positioned to contribute to global engineering research and development as the</li> </ul>	<p>4</p> 

SDG goal	Project alignment with the goal	Score on a scale of 0-5
	<p>ecosystem of captive centres, service providers and start-ups, increasingly work together to drive innovation and IRC-IDC provide the necessary impetus to this conducive environment;</p> <ul style="list-style-type: none"> <li>• IRC-IDC shall house cutting edge technology companies engaged in both product &amp; project design, engineering &amp; consulting as well as consulting support services; and</li> <li>• Encouraging R&amp;D in emerging areas of the knowledge-based green economy.</li> </ul>	
 <p>10 REDUCED INEQUALITIES</p> <p>Reduced inequalities</p>	<ul style="list-style-type: none"> <li>• SE-TP is a powerful tool for community development and reducing inequalities;</li> <li>• SE-TP initiatives are planned to engage local populations and all key stakeholders in its development;</li> <li>• SE-TP contribute to rural development and reduce regional imbalances by giving communities the opportunity to prosper in their place of origin; and</li> <li>• Several capacity-building programmes are coined in the SE-TP initiative to reduce inequalities</li> </ul>	<p>4</p> 
 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p> <p>Sustainable cities and communities</p>	<ul style="list-style-type: none"> <li>• IRC-CoE focusing environment technologies &amp; sustainable business practices, advanced materials &amp; innovative products, built environment &amp; sustainable communities significantly contribute to the development of sustainable cities and communities;</li> <li>• The focus of IRC-CoE for built environment and sustainable communities is in alignment with the goal and shall include structures research, material research, sustainable materials and technologies, architectural design research, construction and project management, energy-efficient building systems design, indoor environmental quality, the showcase of innovative construction and technologies, and building performance and evaluation</li> <li>• The focus of IRC-CoE for innovative materials and innovative products is in alignment with the goal and shall include power electronics materials, devices and integrated systems, grid materials, devices and systems, ceramics, chemicals, polymers, superalloys, semi-conductors, medical biomaterials, nanomaterials, bio-materials, and advanced processes and computation.</li> <li>• Prevention of urban migration and displacement due to SE-TP initiative;</li> <li>• Capacity building initiatives planned in SE-TP on the deployment of indicators for sustainable eco-tourism and sustainable communities living; and</li> </ul>	<p>4.5</p> 

SDG goal	Project alignment with the goal	Score on a scale of 0-5
 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p> <p>Responsible consumption and production</p>	<ul style="list-style-type: none"> <li>Capacity building on risk and crisis management and recovery techniques.</li> <li>IRC-CoE focus on life sciences, alternative &amp; renewable energy, environment technologies &amp; sustainable business practices, advanced materials &amp; innovative products, built environment &amp; sustainable communities and help in achieving reduced consumption and production and promote SCP practices;</li> <li>SE-TP adopts SCP practices can play a significant role in accelerating the global shift towards sustainability;</li> <li>Planned as an eco-friendly initiative, SE-TP along with IRC-CoE&amp;IDC showcase SCP practices;</li> <li>Development and application of tools to monitor sustainable development impacts for SE-TP including IRC-CoE&amp;IDC across all dimensions of sustainability and cultural values; and</li> <li>The SE-TP, along with IRC-CoE&amp;IDC, aims at developing such responsible consumption and production practices, including resource efficient initiatives that result in enhanced economic, social and environmental outcomes.</li> </ul>	<p>4.5</p> 
 <p>13 CLIMATE ACTION</p> <p>Climate action</p>	<ul style="list-style-type: none"> <li>IRC-CoE focus on life sciences, alternative &amp; renewable energy, environment technologies &amp; sustainable business practices, advanced materials &amp; innovative products, built environment &amp; sustainable communities and these initiatives significantly contribute in addressing challenges in the climate change;</li> <li>SE-TP initiative focuses on the development of biodiversity-based tourism products;</li> <li>Capacity building on climate change adaptation and mitigation in the context of sustainable eco-tourism;</li> <li>Sustainable eco-tourism contributes to and is affected by climate change, and initiatives are coined in SE-TP including IDC-CoE&amp;IDC are poised to play a leading role in the global response to climate change; and</li> <li>By lowering energy consumption, green energy-efficient buildings, and shifting to alternative and renewable energy sources, especially in the transport, accommodation sector and built infrastructure, SE-TP along with IDC-CoE&amp;IDC help in tackling one of the most pressing challenges.</li> </ul>	<p>4.5</p> 

SDG goal	Project alignment with the goal	Score on a scale of 0-5
 <p>14 LIFE BELOW WATER</p> <p>Life below water</p>	<ul style="list-style-type: none"> <li>Promotion of Sonadia Island essentially rely on coastal and maritime tourism and, efforts are taken to protect and conserve the healthy marine ecosystems;</li> <li>The SE-TP has a strong TAF component to provide edutainment on marine biology;</li> <li>The oceanarium and marine biology research centre contemplated in the SE-TP provide necessary impetus on promoting and educating on life below water;</li> <li>The IRC-CoE focussing on life sciences also aid in promoting life below water;</li> <li>SE-TP development is conceptualised as an integral part of coastal zone management;</li> <li>Appropriate initiatives and safeguards are incorporated in the SE-TP to conserve and preserve fragile marine ecosystems;</li> <li>SE-TP is also structured as a powerful instrument and vehicle to promote a blue economy to increase the economic benefits to Sonadia Island and Cox's Bazar District; and</li> <li>The SE-TP concept revolves around the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.</li> </ul>	<p>4.5</p> 
 <p>15 LIFE ON LAND</p> <p>Life on land</p>	<ul style="list-style-type: none"> <li>Sonadia Island is blessed with several unique natural features and rich is bio-diversity;</li> <li>Majestic landscapes, rich bio-diversity, and natural settings of SE-TP are coined as fundamental offerings to domestic and foreign tourist visits;</li> <li>SE-TP model of development play a major role, not only in conserving and preserving biodiversity, but also in respecting terrestrial ecosystems, owing to its efforts towards the reduction of waste and consumption, the conservation of native flora and fauna, and its awareness-raising activities;</li> <li>IRC-CoE&amp;IDC shall focus on research activities pertaining to protecting life on land; and</li> <li>Adequate safeguards and policy framework to protect life on land is suggested.</li> </ul>	<p>4.5</p> 
 <p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p> <p>Peace and justice</p>	<ul style="list-style-type: none"> <li>SE-TP aims at large domestics and foreign tourists across diverse culture, age groups, socio-economic strata;</li> <li>IRC-CoE&amp;IDC aims to attract domestic and international cutting-edge research companies to addresses R&amp;D challenges across emerging areas of national interest;</li> <li>SE-TP revolves around billions of interactions between people of diverse cultural background;</li> </ul>	<p>3.5</p> 



SDG goal	Project alignment with the goal	Score on a scale of 0-5
	<ul style="list-style-type: none"> <li>SE-TP can foster multicultural and diverse understanding, laying the foundation for more peaceful societies;</li> <li>SE-TP initiatives benefit and engages local communities and provide a source of livelihood; and</li> <li>SE-TP strengthen cultural identities and spur entrepreneurial activities, thereby helping to prevent violence and conflict to take root and consolidate peace in post-conflict societies.</li> </ul>	
 <p>Partnerships for the goals</p>	<ul style="list-style-type: none"> <li>TKZC comprising of sustainable tourism infrastructure, TAF and IRC-CoE&amp;IDC is driven through private sector initiative or PPP mode of development;</li> <li>Due to its cross-sectorial nature, SE-TP including IRC-CoE&amp;IDC has the ability to strengthen private/public partnerships and engage multiple stakeholders;</li> <li>Upstream and downstream effects on other economic activities on a very large and diversified supply chain;</li> <li>The initiative has several PPP and private sector participation demonstrating the convergence of technical, managerial and financial expertise of players;</li> <li>SE-TP including IRC-CoE&amp;IDC aims to create an enabling institutional structure for addressing identified thrust areas, facilitates the flow of investment, technologies, skill sets and modern management practices;</li> <li>SE-TP including IRC-CoE&amp;IDC aims to provide a mechanism to bring together farmers, rural communities, tour operators, and other tourism value chain actors and link rural communities to the market so as to ensure maximisation of value addition, minimisation of wastages and improving rural communities income; and</li> <li>SE-TP, including IRC-CoE&amp;IDC, has a conducive environment for strategic linkages of – international, national, regional and local agencies to work together to achieve the SDGs and other common goals.</li> </ul>	<p>4.5</p> 

Source: MACE analysis