

13 Environment

13.1 Introduction

Any new development has some or the other impact on the environment. Naya Raipur will grow with time and the increasing population will create pressure on the natural resources. Conservation of natural resources in the settlement is of utmost importance to make it sustainable. Therefore the concept of environmental management is incorporated in the planning process from the very beginning. Following points are significant for proper management of environment in Naya Raipur.

13.2 Water

13.2.1 Surface water

Naya Raipur is dotted with a large number of water bodies. The total area under natural water bodies is 233.71 Ha. The Naya Raipur has three major water bodies that have been integrated in the city plan. The other smaller water bodies shall be integrated in the sector layout (*Refer map 13.1*). Apart from these, there are a number of natural drainage channels and nallahs flowing across the city. As a part of the conservation policy, the major water bodies and other environmentally sensitive areas in the city shall be conserved. Following points should be taken care of:

- A minimum buffer of 20 meters on either side of the canals and streams and 50 m around the water bodies shall be a no development zone in order to prevent pollution and conserve the natural water shed of the water body.
- 100 meters area all along the Mahanadi canal shall be reserved as green without allowing any development or construction activity.
- No untreated water should be let out in the water bodies.

13.2.2 Ground water

The depth of ground water table varies from 5 to 12.5 m bgl in the area. Following measures should be taken to maintain the quality and quantity of ground water.

- Construction of wells, bore wells, tube wells, etc. should be restricted with permission from the concerned agency.
- Water harvesting to be practised on a large scale to maintain the level of ground water.
- Effluent should be properly treated before letting the same on vacant land to avoid seepage and contamination.

13.3 Sewerage

80% of the total water consumption goes as sewerage. Sewage to be treated to the standards as prescribed by the Central/State Water Pollution Control Boards. Efforts should be made for re-use of water for irrigation.

13.4 Drainage

- Roadside drains to be provided and the same to be managed in clean condition.
- The water from these drains should be recycled and reused.
- The major natural drainage channels not to be disturbed.

13.5 Solid Waste

An effective solid waste management system is necessary for maintaining the health and hygiene within a city. The important points to be considered are as under

- Waste segregation should be practiced at household and community level.
- Dustbins should be provided at appropriate locations.
- Regular collection should be done by the competent authority
- The site for waste disposal should be properly and scientifically selected so that no contaminants percolate into the ground water, river or lake.
- Hazardous waste and bio-medical waste should be disposed off separately.
- Waste disposal areas should be planned down-wind of villages and townships.
- The pattern of filling disposal site should be planned to create better landscape and be approved by appropriate agency and the appropriately pre-treated solid wastes should be disposed according to the approved plan.
- Intensive programs of tree plantation on disposal areas should be undertaken.

13.6 Air Pollution

The setting up of Naya Raipur in the rural settings of the Raipur district is bound to have an impact on the air quality during the implementation phase as well as in the post implementation phase of the project. The construction activity results in a high concentration of SPM in the air. The vehicular emission in a city results in the concentration of NO_x, CO, SO₂, HC. A rail based transit system is proposed which will reduce the movement of autos within and outside the residential and other areas.

- The environmental policy of the city aims towards maintaining the air quality at the lowest possible levels through following steps:
- Minimising the vehicular traffic through the introduction of integrated multi-modal transport system.
- Green buffers to attenuate the pollution effects.
- Mass transit system has been proposed for the new city in order to reduce the vehicular emissions to a large extent.
- The city wide pedestrian paths that have been incorporated in the design would also help discourage the use of vehicles over short distances.
- Controlling fuel quality (including switching to cleaner fuels and improving the quality of fuels to reduce emissions).

13.7 Noise

The major sources of noise are -

- Road traffic;
- Aircraft;
- Industry

To reduce the noise level, the arterial roads are designed to have 2 to 3 rows of plantation and also there could be additional rows of plantation as part of the development. The light industry zone and freight complex in general are located in the flight path.

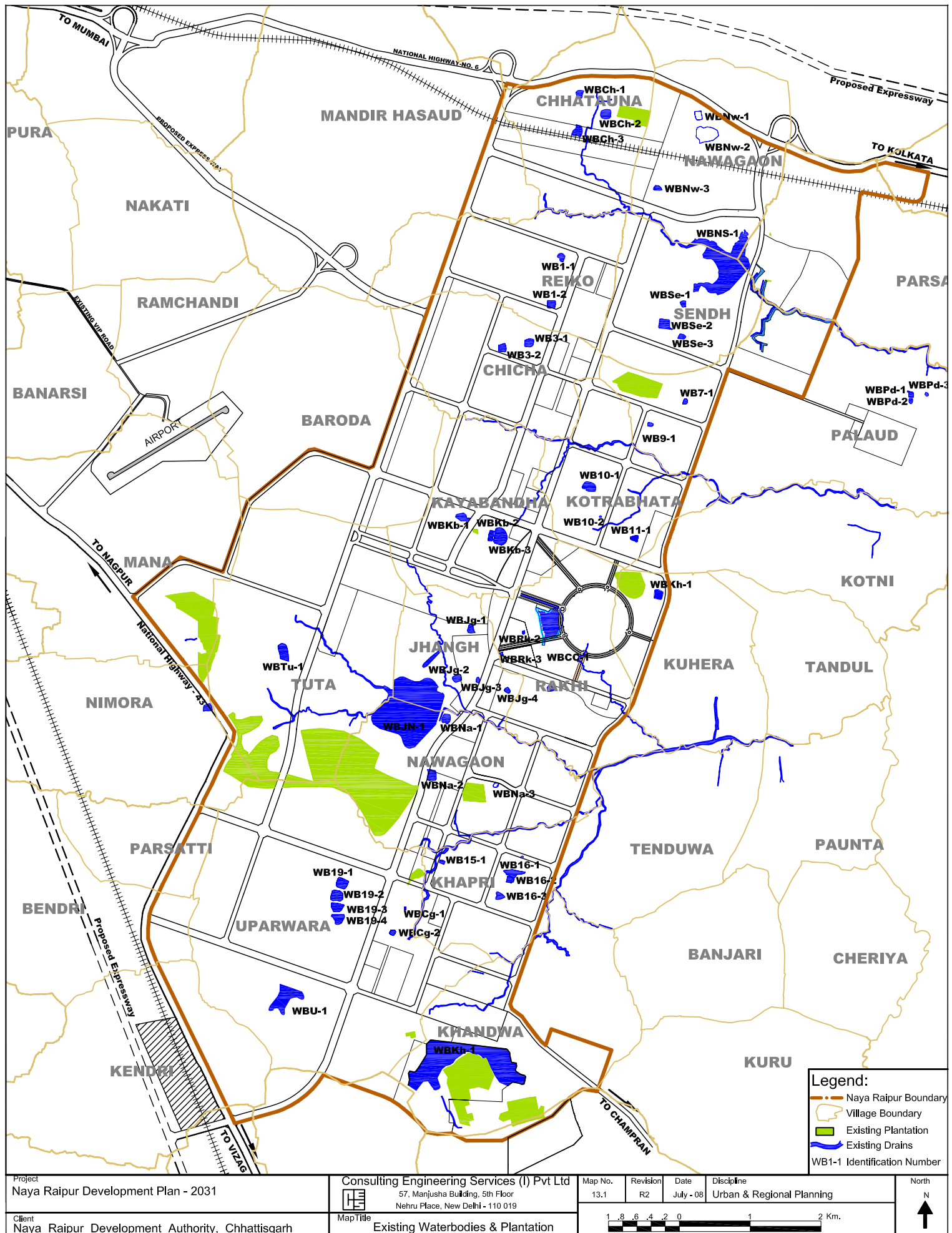
13.8 Energy Conservation

The physical planning policy aims at achieving a sustainable growth through energy conservation and optimum utilization of the natural energy resources.

- Energy conservation shall be encouraged through community and site planning, design, and the use of energy-efficient materials and landscaping. When development applications are reviewed, consideration shall be given to energy conservation measures such as the solar orientation of buildings, use of landscaping and building materials.
- Energy conservation and efficiency shall be encouraged in all facilities owned and operated by the City.
- Renewable sources of energy shall be promoted to reduce pressure from the conventional sources of power.
- Solar energy to meet some of its energy requirements. Electrically run vehicles could be introduced within the sectors. The road signals could run through solar energy.

13.9 Environmental Policy and Legal Issues

Project and project area will be under the purview of water (Prevention and Control of Pollution) Act 1974; Air (Prevention and control of Pollution) Act 1981, the Environment (projection) Act 1986 via Chhattisgarh Environment Conservation Boards (CECB), (State Pollution Control Boards) newly established for Chattisgarh to implement and enforce the national standards for effluents, water quality, ambient air quality and ambient noise level. Further, the project will be under the purview of the guidelines of CPCB formulated for municipal waste generation as Municipal waste (Management and Handling) Rules 1999; Hospital Waste Generation as Bio-medical Waste (Management & Handling) Rules 1998.



14 Peripheral Area

14.1 General Introduction

Around the proposed Naya Raipur city area, 130.28 sq. km. area is identified as peripheral area to act as buffer zone between the proposed Naya Raipur city and the existing Raipur. This area would generally remain rural / agricultural.

14.2 Population

The Jurisdiction of Naya Raipur Development Authority (NRDA) forms the outer boundary of the Peripheral Region that comprises twenty-six revenue villages. The overall population of the peripheral area:

Table 14.1: Overall Population of Naya Raipur Peripheral Area

Year	Population	Decadal Variation
1991	46,628	-
2001	55,880	19.84 %

Source: Census of India

14.3 Planning Approach

The settlements falling in the peripheral region have been classified based on the CFI (Cumulative Facility Index) and have been categorized in the following hierarchy (*refer annexe I for CFI calculations*).

The following hierarchy of settlements has been followed –

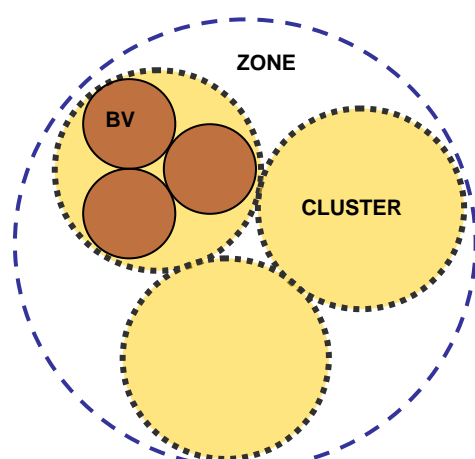


Figure 14.1: Conceptual Hierarchy of Settlements

1. Basic Village
2. Central Village and
3. Zonal Village

The CFI has been computed for each village based on the availability of

1. Educational facilities
2. Health facilities
3. Drinking water
4. Communication
5. Bus & Railway connectivity
6. Bank facility and
7. Connectivity by paved road

In order to avoid the dependence of the peripheral region on Naya Raipur, the villages shall be provided with the entire basic infrastructure and services.

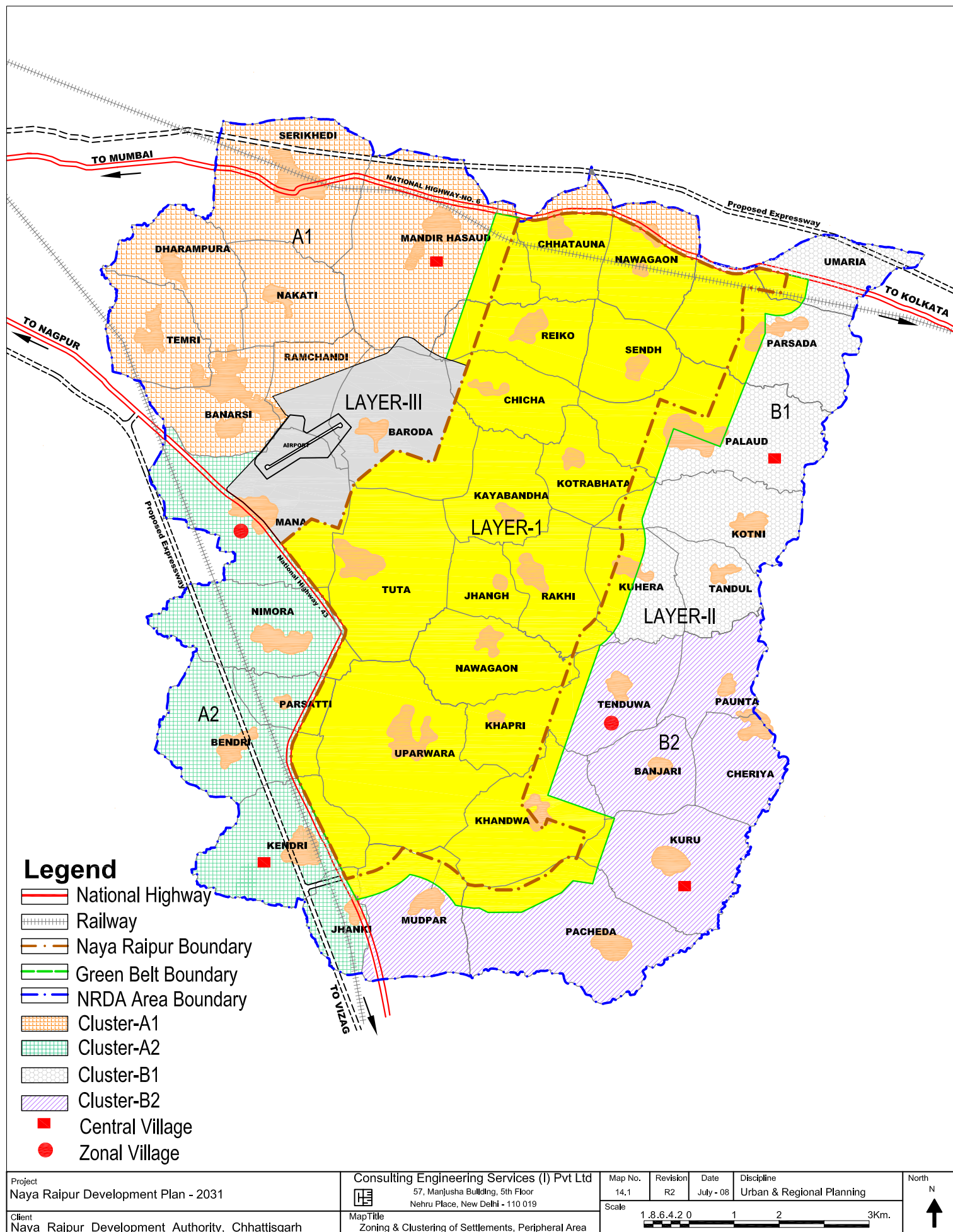
Table 14.2: Hierarchy of Villages based on CFI

Order of Settlement	CFI Weightage scored	Name of Settlement
I	50+	Mandir Hasaud
II	30-49	Banarsi-I (Banarsi), Mana
III	15-29	Temri, Dharampura, Kurru, Parsada-3 (Parsada), Kendri, Palaud-1 (Palaud), Pacheda-2 (Pacheda), Nimora-2 (Nimora)
IV	Less than 14	Serikhedi, Khanduwa, Umariya, Tenduwa-2 (Tenduwa), Bendri-2 (Bendri), Parsatti-2 (Parsatti), Jhanki, Mudpar Alias Bhelwadih, Tandul, Nakati, Cheriya, Banjari, Paunta, Kuhera, Kotni

Table 14.3: Proposed clustering & zoning of the villages (Refer map 14.1)

Planning zones	Clusters	Villages	Central village	Zonal village
ZONE A	Cluster-A1	Dharampura Temri Nakati Mandir Hasaud Serikhedi	Mandir Hasaud	Mana
		Banarasi		
	Cluster-A2	Mana Nimora Parasatti	Kendri	
		Bendri Kendri Jhanki		

ZONE B	Cluster-B1	Umariya Parsada (portion outside Layer I) Palaud (portion outside Layer I) Kotni	Palaud	Tenduwa
		Tandul Kuhera (portion outside Layer I)		
	Cluster-B2	Tenduwa Paunta Mudpar (portion outside Layers I) Pacheda (portion outside Layers I) Khanduwa (portion outside Layers I) Kuru Cheriya Banjari	Kuru	



14.4 Population Distribution

The CAGR for 1991-2001 that works out to be 1.78% and has been adopted as the overall growth rate for the peripheral region. This population has been further distributed over three zones (*refer table 14.4*) and projected based on the percentage break-up for the year 2001.

Table 14.4: Cluster-wise projected population for Peripheral Region

Zone	Cluster	2001	2011	2021	2031
Zone A	A1	23,693	28,250	33,683	40,161
	A2	13,831	16,491	19,663	23,444
Sub-Total		37,524	44,741	53,346	63,605
Zone B	B1	10,148	12,100	14,427	17,201
	B2	8,208	9,787	11,669	13,913
Sub-Total		18,356	21,887	26,096	31,114
Total		55,880	66,628	79,442	94,719

14.5 Housing

The housing requirement for the peripheral region by the horizon year 2031 is as follows –

Table 14.5 Housing requirement for Peripheral Area

Zone	Cluster	2011			2021			2031		
		Additional Population	Area (Ha)	Housing Units Required	Additional Population	Area (Ha)	Housing Units Required	Additional Population	Area (Ha)	Housing Units Required
		1	2	3	1	2	3	1	2	3
Zone A	A1	4,557	30	760	5,433	36	906	6,478	43	1,080
	A2	2,660	18	443	3,172	21	29	3,781	25	630
Sub-total		7,217	48	1,203	8,605	57	1,434	10,259	68	1,710
Zone B	B1	1952	13	325	2327	16	388	2774	18	462
	B2	1579	11	263	1882	13	314	2244	15	374
Sub-total		3,531	24	589	7,740	52	1,290	5,018	33	836
Total		10,748	72	1,791	23,562	157	3,927	15,277	102	2,546

Note: The average density of 150 person per hectares have been proposed

Adopted average household size - 6

Individual village plans shall be prepared to identify land for the housing of the additional population.

14.6 Connectivity

All the basic villages to be connected to the Central village by a village road. The Central villages would be connected to the Zonal village by paved roads. This would require upgradation of roads.

14.7 Physical Infrastructure

14.7.1 Water Supply

14.7.1.1 Existing scenario

Most of the villages in NRPR are situated near ponds and lie in the command area of Mahanadi main canal and Abhanpur branch canal. The yield of hand pumps in this area varies from 6-10 KLPD on an average. Banarsi, Umariya and Kurru have tap water supply. The villagers at present get a water supply of about 35- 45 LPCD through individual hand pumps.

14.7.1.2 Norms for water supply

The norm of one-hand pump or spot source for every 50 persons as suggested by Planning Commission Govt. of India in five year plan (2002-2007) would be adopted. Based on the norm the NRPR would require 1824 hand pumps by 2031.

14.7.2 Rural Sanitation

14.7.2.1 Existing scenario

The peripheral villages of NRPR do not have proper sanitation facility. Most of the rural population use open lands for defecation, which leads to ground water contamination and poses health hazards.

Programmes for low cost rural sanitation schemes where sewerage system is not viable both technically and financially need to be drawn for 100% coverage. Sullage water in rural areas may be collected and conveyed through open drains to oxidation ponds for treatment.

14.7.2.2 Technology options

The possible disposal systems, under low cost sanitation programme, are:

1. Dry Latrine with double pits
2. Sanitary Latrine
3. Aqua Privy
4. Septic Tank

14.7.3 Solid Waste Management

14.7.3.1 Existing Scenario

At present there is no facility for the disposal of solid wastes. Currently, solid waste generation per person in the peripheral region is low, as lot of waste is unaccounted for as it is not collected or kept on road side and allowed to be spread in open lands or discharged through open storm water drains.

14.7.3.2 Projected solid waste generation

Quantities of solid waste likely to be generated in the peripheral region in the years have been projected for the years 2011, 2021 and 2031 as follows:

Table 14.6: Zone wise Solid waste generation

Zone	Solid waste likely to be generated (MT)		
	2011	2021	2031
Zone A	26.84	32.01	38.16
Zone B	13.13	15.66	18.67
Total	39.98	47.67	56.83

Note: Norm adopted - 600 grams of solid waste generated per person per day

14.7.3.3 Providing Modern Land Fill Areas:

A tentative estimate for landfill area required for dumping of solid waste for next 30 years is as below:

Table 14.7: Landfill area requirement for Peripheral area

Zone	Solid Waste in 2031 (MT)	Solid waste sent to landfill site after decomposing (MT)*	Total land requirement** (Ha)
Zone A	38.16	22.90	0.46
Zone B	18.67	11.20	0.22
Total	56.83	34.10	0.68

* 60% of the total expected solid wastes to be sent to land fill area

**Land requirement computed at 0.02 Ha per MT

Two landfill sites, one in each zone as per the requirements computed in table are required to be identified in the NRPR. For this a private agency may be appointed or assistance of NGO may be taken under self-financing programme.

14.8 Social Infrastructure

The social infrastructure comprises of education, health, recreational and various other facilities. The section deals with education and health facility.

The objective of this section is to formulate a balanced distribution of education and health facility by improving access to these facilities.

14.8.1 Health Facilities

The norms adopted for Health Infrastructure are as follows –

Table 14.8: norms adopted for Health Infrastructure

Facilities	Norms
Sub-Health Centre	1 for every two villages
Primary Health Centre	1 for every central village
Community Health Centre	1 for every Zonal village

Table 14.9: Proposed Health Infrastructure in peripheral area

Health Facility	Norm	Proposed Health Facilities in the Villages
Sub-Health Centre	1 for every two villages	Banarsi-I (Banarsi), Nakati, Nimora-2 (Nimora), Bendri, Parsada-3 (Parsada), Pacheda-2 (Pacheda), Khanduwa, Kuhera
Primary Health Centre	1 for every central village	Mandir Hasaud, Kendri, Palaud, Kuru
Community Health Centre	1 for every zonal village	Mana, Tenduwa
Hospital (50 bedded)	1 for every zonal village	Mana, Tenduwa

14.8.2 Educational Facilities

Following are the norms adopted for educational infrastructure

Table 14.10: Norms adopted for provision of Educational facilities

Facilities	Population Characteristics	Capacity of the Facility
Primary School	1 for 4000 population	500 students
Higher Secondary	1 for 7500 population	1000 students

The peripheral region presently has 34 primary schools, 18 middle schools, 3 secondary and senior secondary schools and 1 college. The existing middle schools could be upgraded to the higher secondary level rather than constructing new schools.

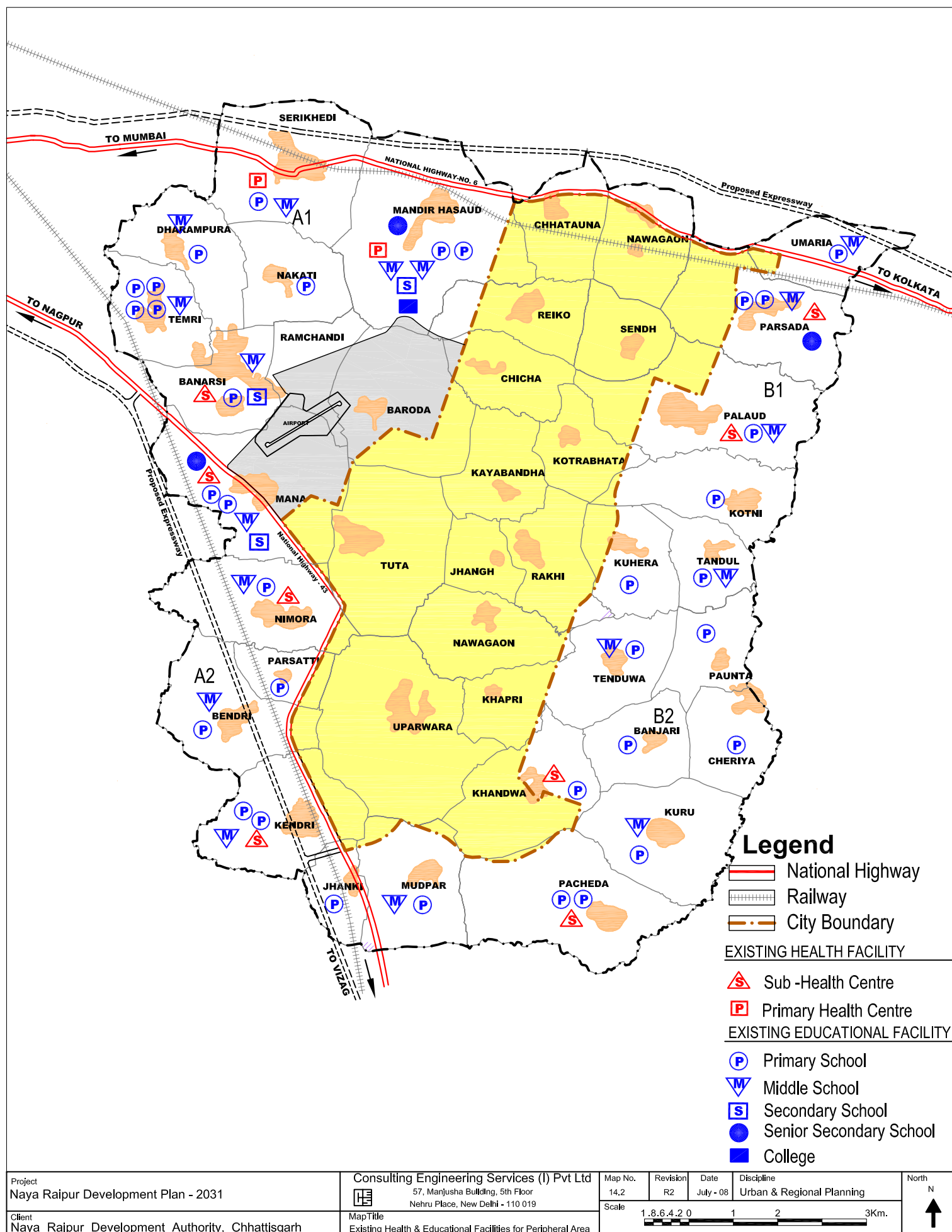
Table 14.11: Proposed Educational facilities in Peripheral area

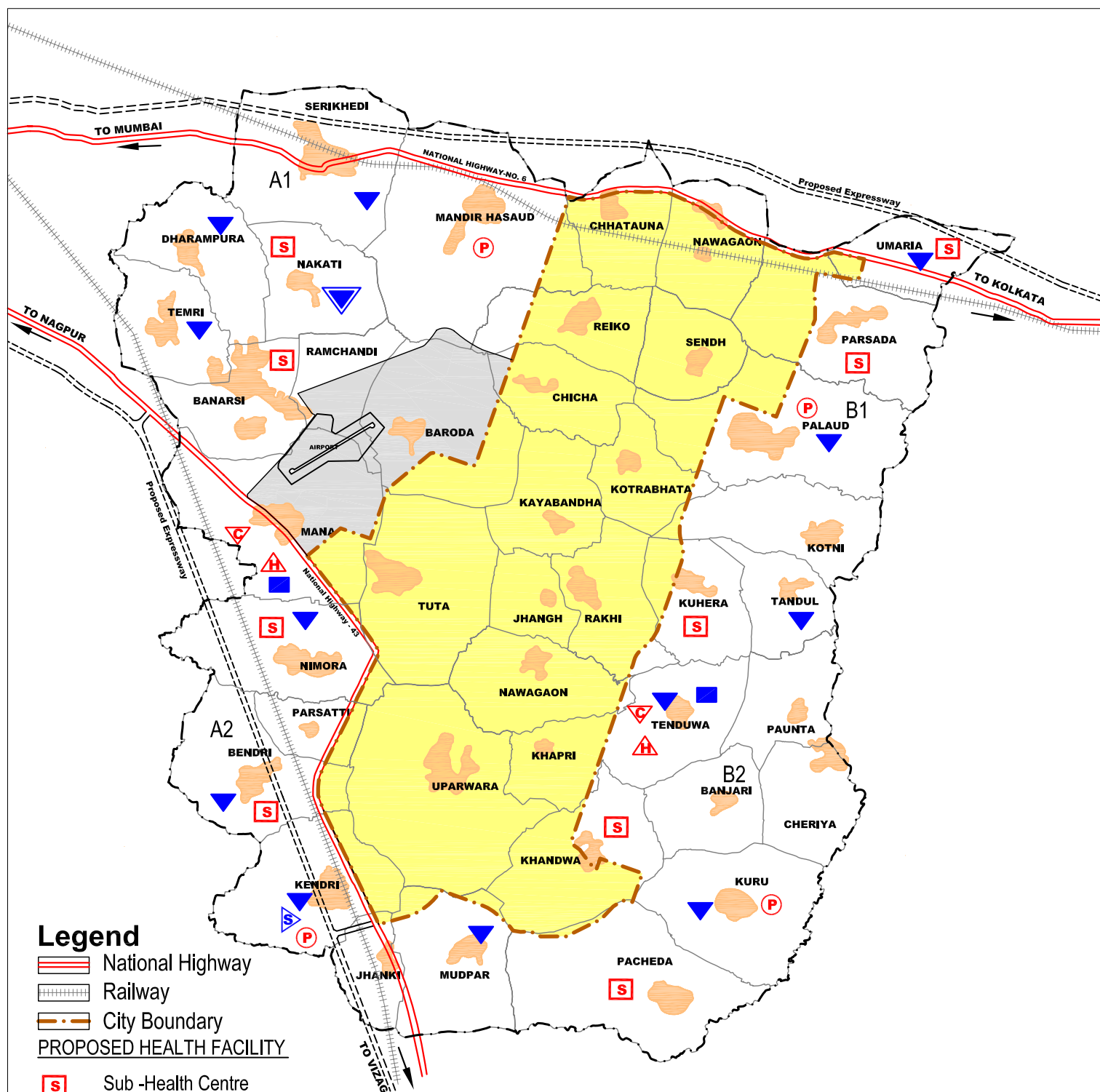
Health Facility	Norm	Villages to be provided/upgraded with additional Schools
Primary School	1 for 4000 population Planning Commission	All villages have access to primary education facilities
Higher Secondary	1 for 7500 population	To be Upgraded Dharampura, Temri, Serikhedi, Nimora, Bendri, Kendri, Umariya, Palaud, Tandul, Mudpar, Kurru, Tenduwa
		To be Provided Nakati
College/Vocational Training Centre	1 in each Zonal Village	Mana, Tenduwa

14.9 Other Facilities

Every Zonal village shall have a facility centre comprising -

1. Sports and recreational areas
2. Shopping areas





Legend

- National Highway
- Railway
- City Boundary

PROPOSED HEALTH FACILITY

- Sub -Health Centre
- Primary Health Centre
- Community Health Centre
- Hospital (50 Bedded)

PROPOSED EDUCATIONAL FACILITY

- Proposed Sr Secondary School
- Middle and Secondary School to be upgraded to Sr Secondary School
- College / Vocational Training Centre

Project
Naya Raipur Development Plan - 2031

Client
Naya Raipur Development Authority, Chhattisgarh

Consulting Engineering Services (I) Pvt Ltd
57, Manjusha Building, 5th Floor
Nehru Place, New Delhi - 110 019

MapTitle
Proposed Health & Educational Facilities for Peripheral Area

Map No.
14.3

Revision
R2

Date
July - 08

Discipline
Urban & Regional Planning

Scale

1:8.6.4.2.0 1 2 3Km.

North
N

Figure 14.2 Proposed Facilities for Peripheral Region
(Development Controls as given in Section 18.6.2.4 applicable)

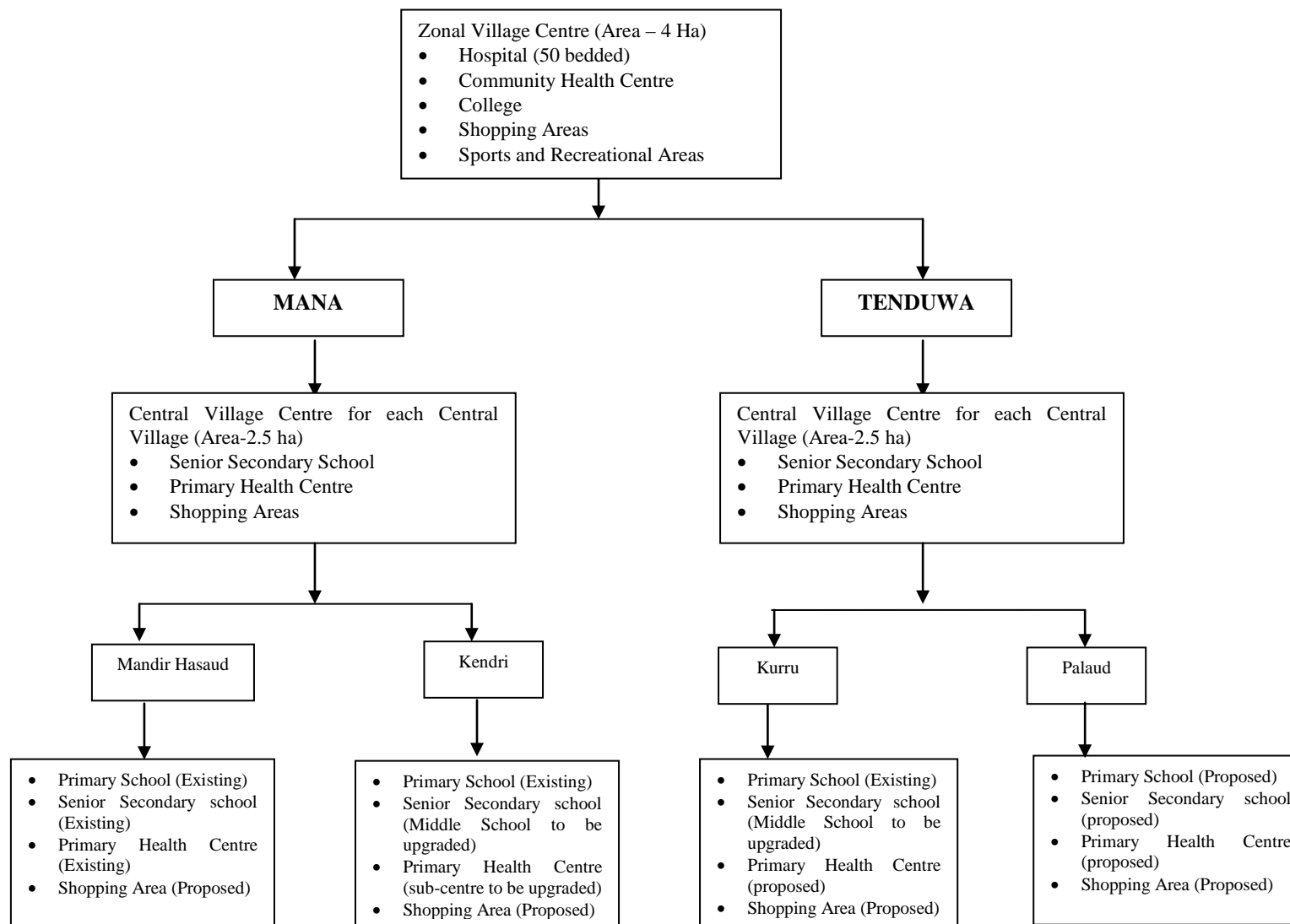


Figure 14.2 Proposed Facilities for Peripheral Region (Development Controls as given in Section 18.6.2.4 applicable)

15 Airport Zone

The Airport zone (Planning Layer III) consists of the Mana Aiport and the surrounding village agricultural area. This includes parts of Mana, Barouda, Ramchandi and Banarsi village revenue estates. Spread over an area of 1192.56 hectare (*Refer map 15.1*). The zone abuts the Software Technology Park on the east. It is demarcated considering the proposed runway extension and the proposed expressway to its north. Presently the airport runway length is 6400 feet (1950 m). The Airport Authority of India proposes to extend the runway length to 3810 m (12,500 feet). Taking into consideration the appropriate no development zone, the development plan proposes an Expressway (100m R/W) originating from NH-6 and connecting the 100 m western peripheral arterial road, Naya Raipur city. The additional area around the present airport as a part of the Airport Zone is reserved for other allied activities for the airport such as cargo housing, staff quarters, etc. The height restrictions with respect to approach funnel and with respect to the transitional area of the airport shall be as follows.

Table 15.1 Height Restriction with Respect to Approach Funnel

Distance from nearest runway end (in metres)	Maximum Permissible height above the elevation of the nearest runway end (in metres)
Upto 360	0
More than 360 but not exceeding 510	6
More than 510 but not exceeding 660	9
More than 660 but not exceeding 810	12
More than 810 but not exceeding 960	15
More than 960 but not exceeding 1110	18
More than 1110 but not exceeding 1260	21
More than 1260 to 1410	24
More than 1410 but not exceeding 1560	27
More than 1560	30

Source: National Building Code, AAI Codes

Table 15.2 Height Restrictions with Respect to Transitional Area

Distance from the Inner Boundary of the Transitional Area Specified (in metres)	Maximum Permissible height above the elevation of the air port reference point (in metres)
Up to 21	0
More than 21 but not exceeding 42	3
More than 42 but not exceeding 63	6
More than 63 but not exceeding 84	9
More than 84 but not exceeding 105	12
More than 105 but not exceeding 126	15
More than 126 but not exceeding 147	18
More than 147 but not exceeding 168	21
More than 168 but not exceeding 189	24
More than 189 but not exceeding 210	27
More than 210 M	30

Source: National Building Code, AAI Codes

