4．プロジェクト対象地区の自然条件

4－1　測量・地形図

インド国において入手可能な国土基本図は、縮尺25万分の1、縮尺5万分の1と部分的ではあるが縮尺2万5,000分の1である。インド国において軍事基地や海岸線が載っている縮尺2万5,000分の1の地図の入手は、困難である。ＫＧルート及びＧＭルートの選定を行うために、縮尺5万分の1の国土基本図を使用する。

当調査対象地域を覆うシートは、No.53Ｈ／1，53Ｈ／2，53Ｈ／5，53Ｈ／6，53Ｈ／9，53Ｈ／10の6面である。また、ＮＣＲＰＢより縮尺5万分の1のデジタルデータの提供を受けられる。

25万分の1図は、すでに測量調査から20年以上経過しており、また5万分の1図は30年近く経過している。したがって、河川の形の変化や住宅地域の拡大などの情報が図面上より得られないため、概略設計を行うための図面としては不適当と判断し、本格調査ではローカル・コンサルタントへ再委託調査とし、縮尺2,500分の1の地形図の実測を行う。

4－2　地形・地質

当調査対象地域は、北緯28度40分から29度00分、東経77度05分から77度45分の間に位置し、標高200メートル程度の平坦地である。

河川は、幅が1,000メートルほどのYamuna川とHindan川が北から南へ流れており、デリー市の南東約50キロメートル地点で合流し、ガンジス河と名を替えベンガル湾へと流れ込む。

当調査対象地域の表面の地層はヒマラヤ山脈から運ばれた土砂から成る第四期沖積層で、その下層は石英岩、片岩、片麻岩などから成るカンブリア紀前の硬岩層である。

デリー市内を流れているYamuna川のボーリング調査のデータによると、地下20～30メートルまでＮ値30～40であるが、一度乱すと固まりにくい。その下層はＮ値50以上の支持層である。

Faridabadでは花崗岩の採石場があり、コンクリート材、舗装材に適しているが、プロジェクトサイトからは離れている。

インド国の特定の地域では地質的に不安定で、しばしば破壊的な地震が起きている。当調査対象地域は、Indian Standardによると、5段階に分類された構造物の耐震設計にかかわる地震係数のゾーン区分による分布では、上位から2番目の強度の係数(ZONE IV)となる。

ＮＣＲの標高図、及び地質図を図4－1と図4－2に示す。

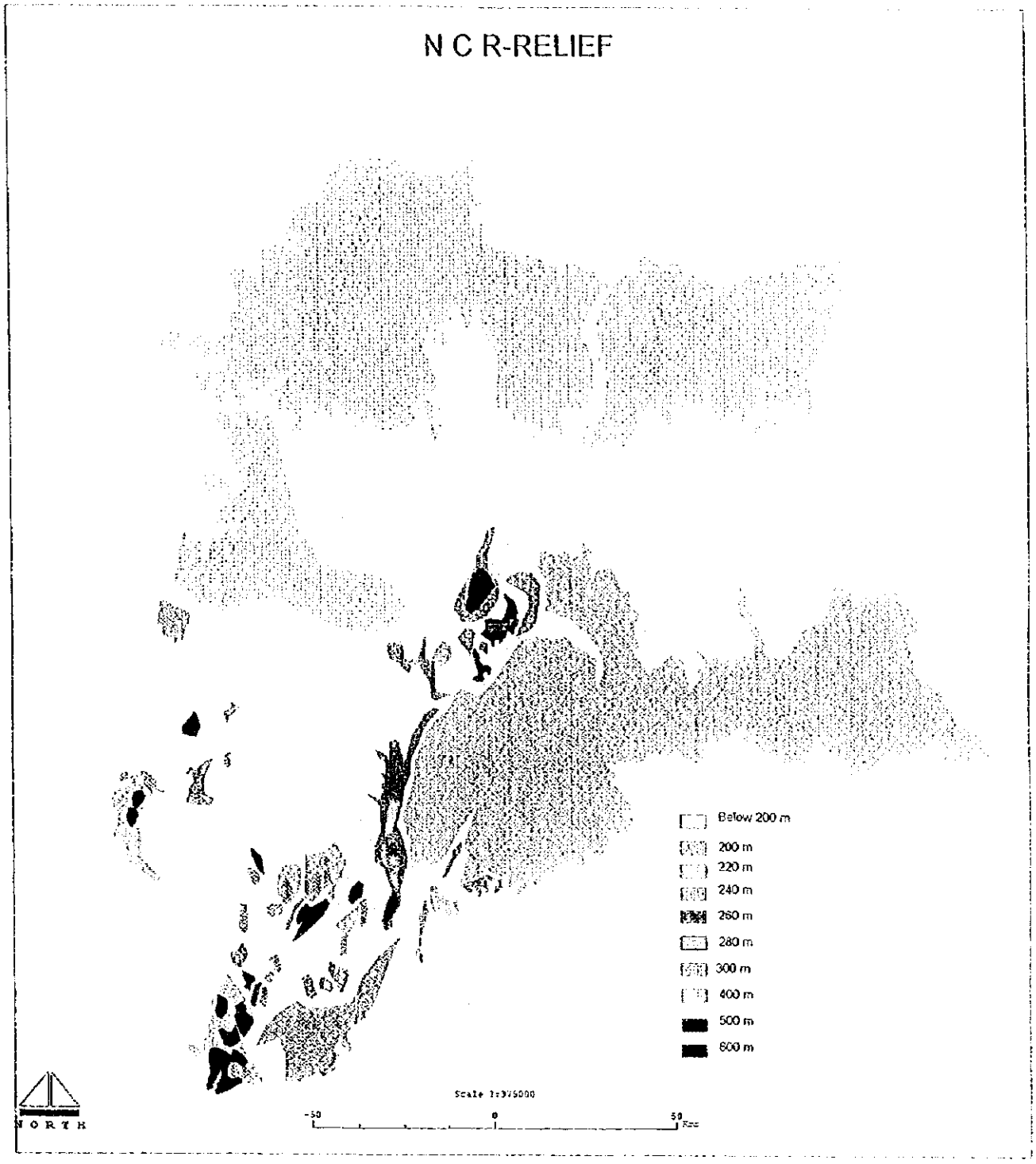

N C R-RELIEF
Below 200 m
200 m
220 m
240 m
260 m
280 m
300 m
400 m
500 m
600 m
NORTH
Scale 1:375000
-50
0
50

図４－１　ＮＣＲの標高

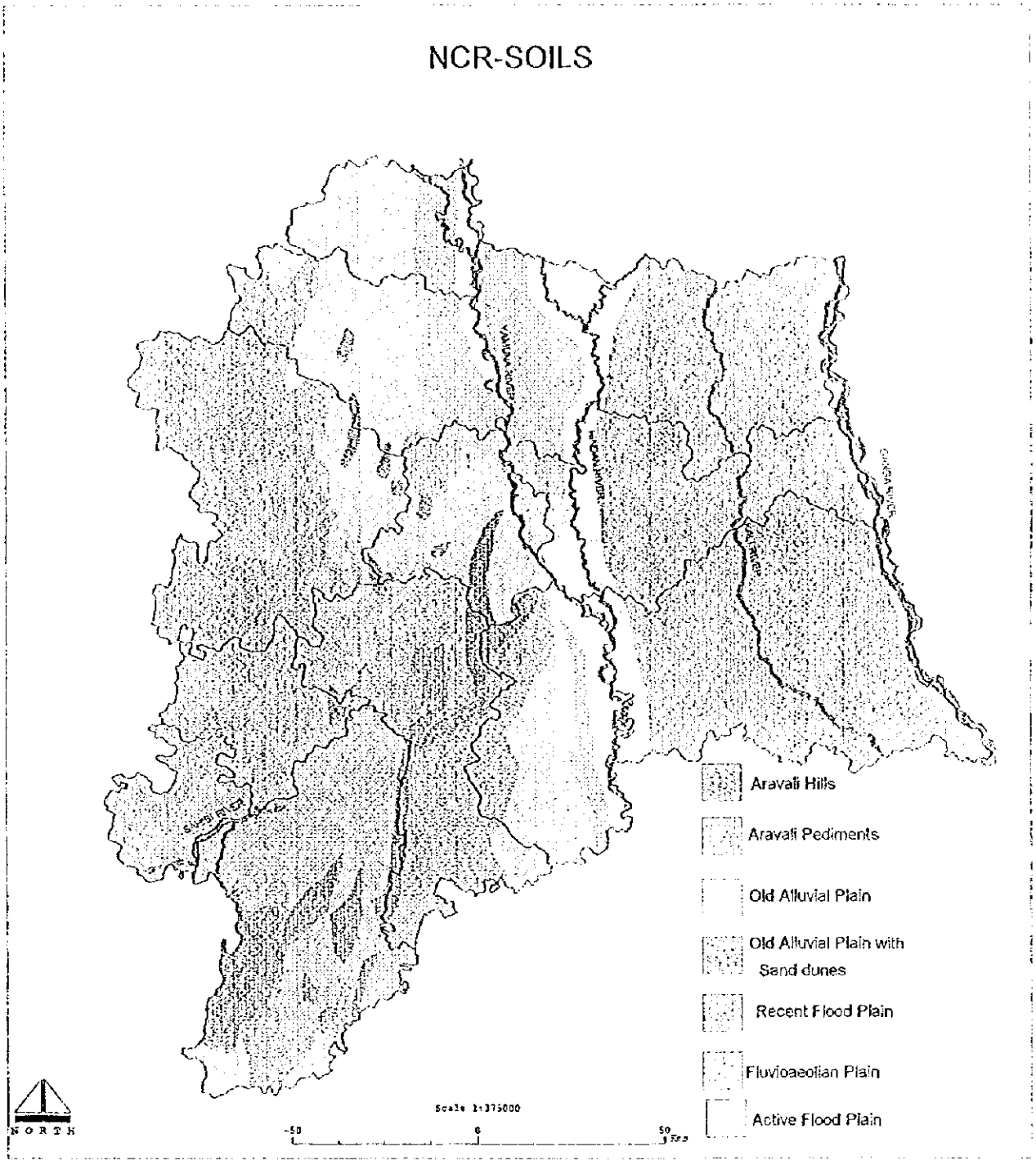

NCR-SOILS
Aravali Hills
Aravali Pediments
Old Alluvial Plain
Old Alluvial Plain with Sand dunes
Recent Flood Plain
Fluvioaeolian Plain
Active Flood Plain
NORTH
Scale 1:375000
-50
0
50

図４－２　ＮＣＲの地質

4－3　気象・水文

プロジェクト対象地区は北インド平野部に位置し、4月から6月の間が1年中で1番気温が上がる暑期(夏)になる。その後、雨期に入るとかえって気温は下がる。

7月から9月の雨期にはインド国南西から、アラビア海の湿気を含んだ季節風が吹き寄せる。このモンスーンがインド国の大部分に雨をもたらす。そのため、下流域では雨水が増水し、たびたび洪水が起こる。

この時期には、本格調査の測量作業は難しいので6月末までに終わらせるように作業を進める必要がある。11月から2月は冬で、プロジェクト対象地域ではかなり冷え込む。

洪水防止の手だてとして、1954年に「全国洪水予防計画」が発令された。それ以来洪水予防の方策が取られかなりの成果を得た。被害を受けやすい地域では、土手を高くしたり、遊水池を造ったり、また広い地域に渡り運河を造ることにより、大量の雨水の集中を防ぎ、水の分散化を図っている。

デリーの気温と降水量を表4－1に、ＮＣＲの流域図、洪水被災多発地域図を図4－3、図4－4に示す。

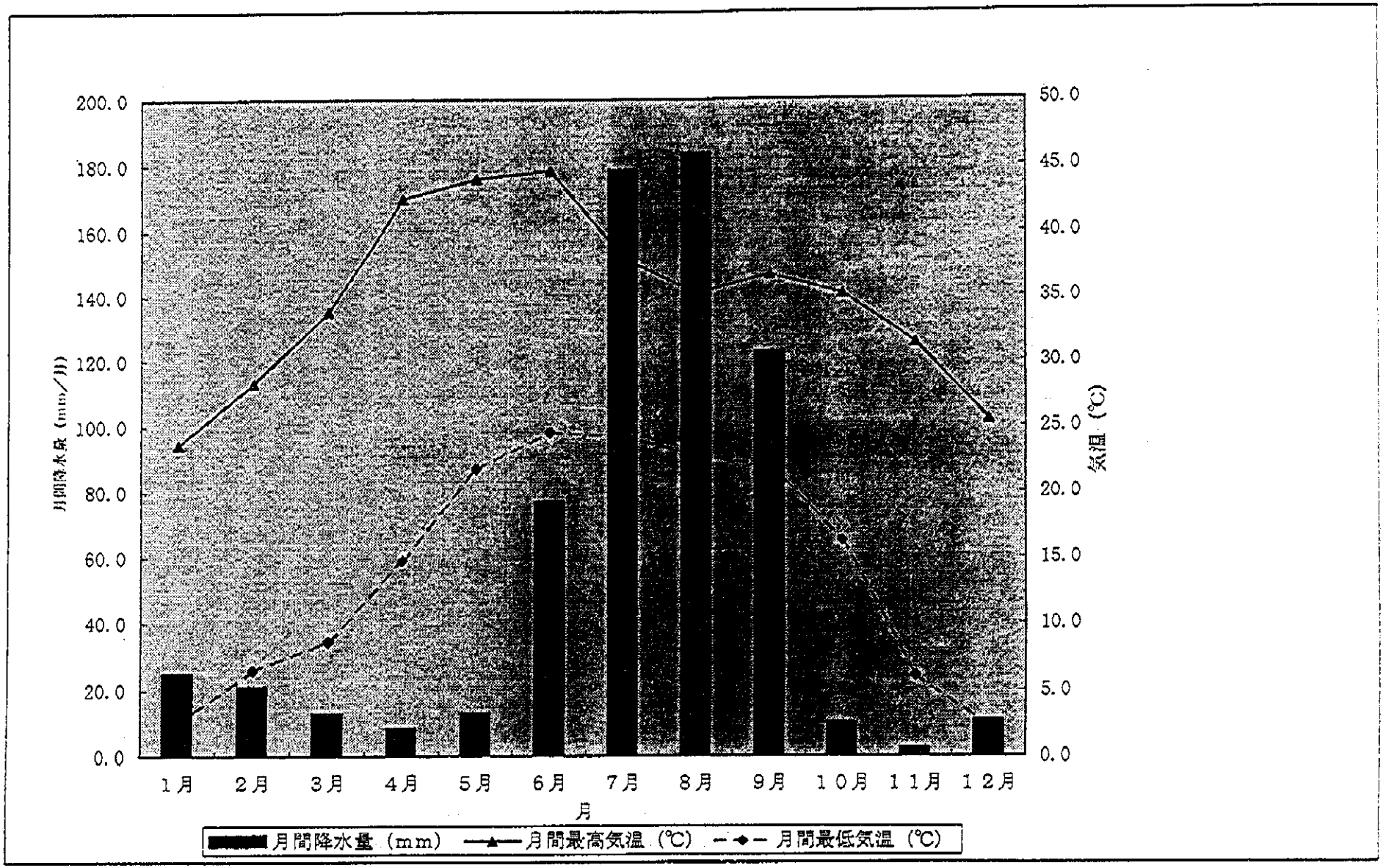
4－4　自然条件関連資料の入手可能性

下記の資料が入手可能である。

資　料	入手場所
1．地形図・航空写真	Survey of India
2．自然保護地域図	Survey of India
3．地質データ	Geological Survey of India
4．三角点・水準点データ	Survey of India
5．気象データ	P.W.D. Meteorological Department
6．河川データ	Ministry of Water Resources
7．土地利用図・土地利用計画図	ＮＣＲＰＢ
8．地震・地滑りなどのデータ	P.W.D. Meteorological Department
9．植生	Ministry of Agriculture
10．景勝地データ	P.W.D.

また、ＮＣＲＰＢ発行の「STUDY ON DRAINAGE SYSTEM AND FLOOD CONTROL INCLUDING WATER RESOURCES IN NATIONAL CAPITAL REGION」1994年版は、ＮＣＲの地形・地質・気象・水文データが詳しく記されており、本格調査時にコピーの入手が可能である。

表４－１　デリーの気温と降水量



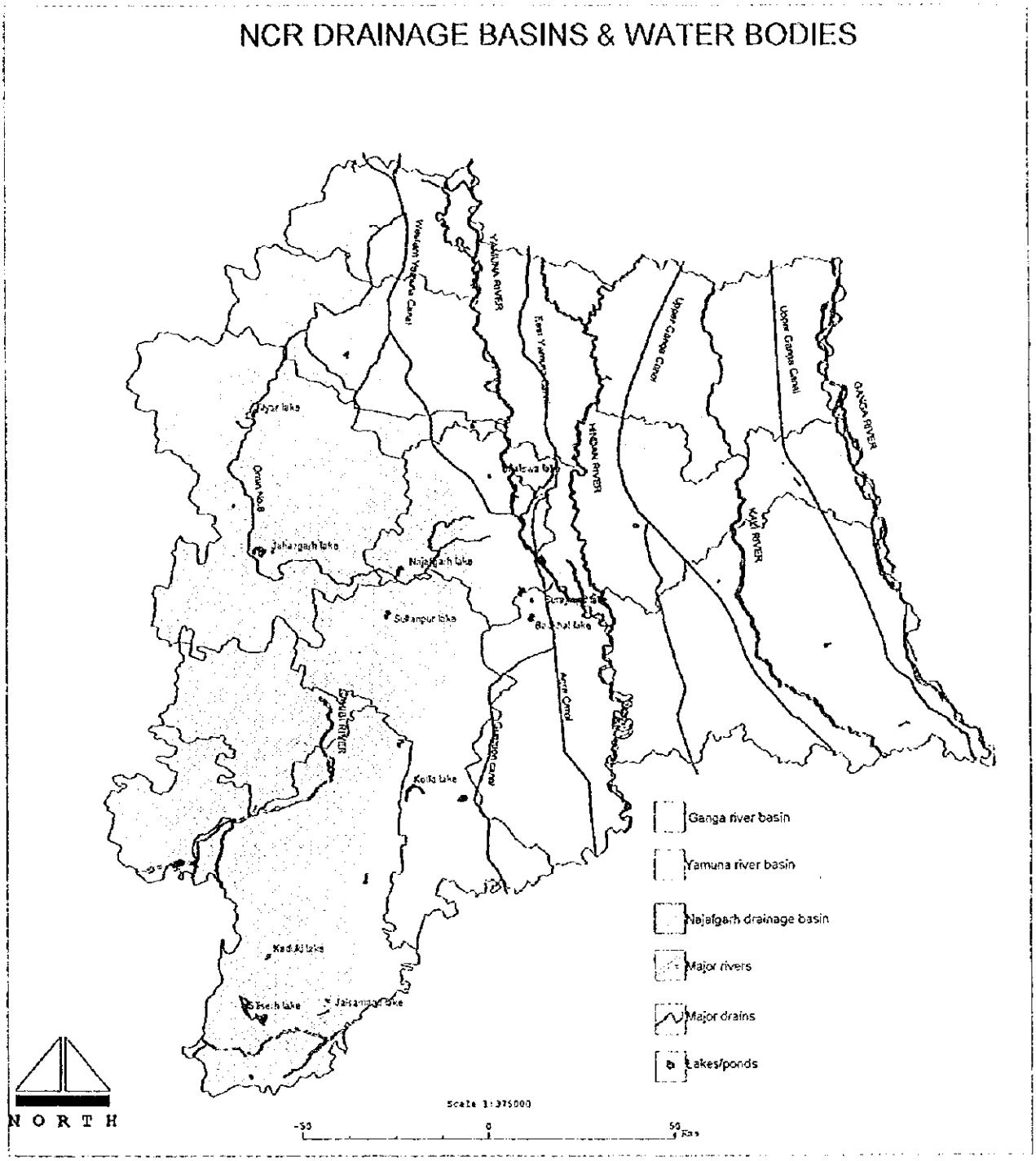

NCR DRAINAGE BASINS & WATER BODIES
Western Yamuna Canal
YAMUNA RIVER
Eastern Yamuna Canal
Upper Ganga Canal
Lower Ganga Canal
GANGA RIVER
HINDAN RIVER
KALI RIVER
Agra Canal
Ganga river basin
Yamuna river basin
Najafgarh drainage basin
Major rivers
Major drains
Lakes/ponds
NORTH
Scale 1:975000
50 Kms

図４－３　ＮＣＲの流域図

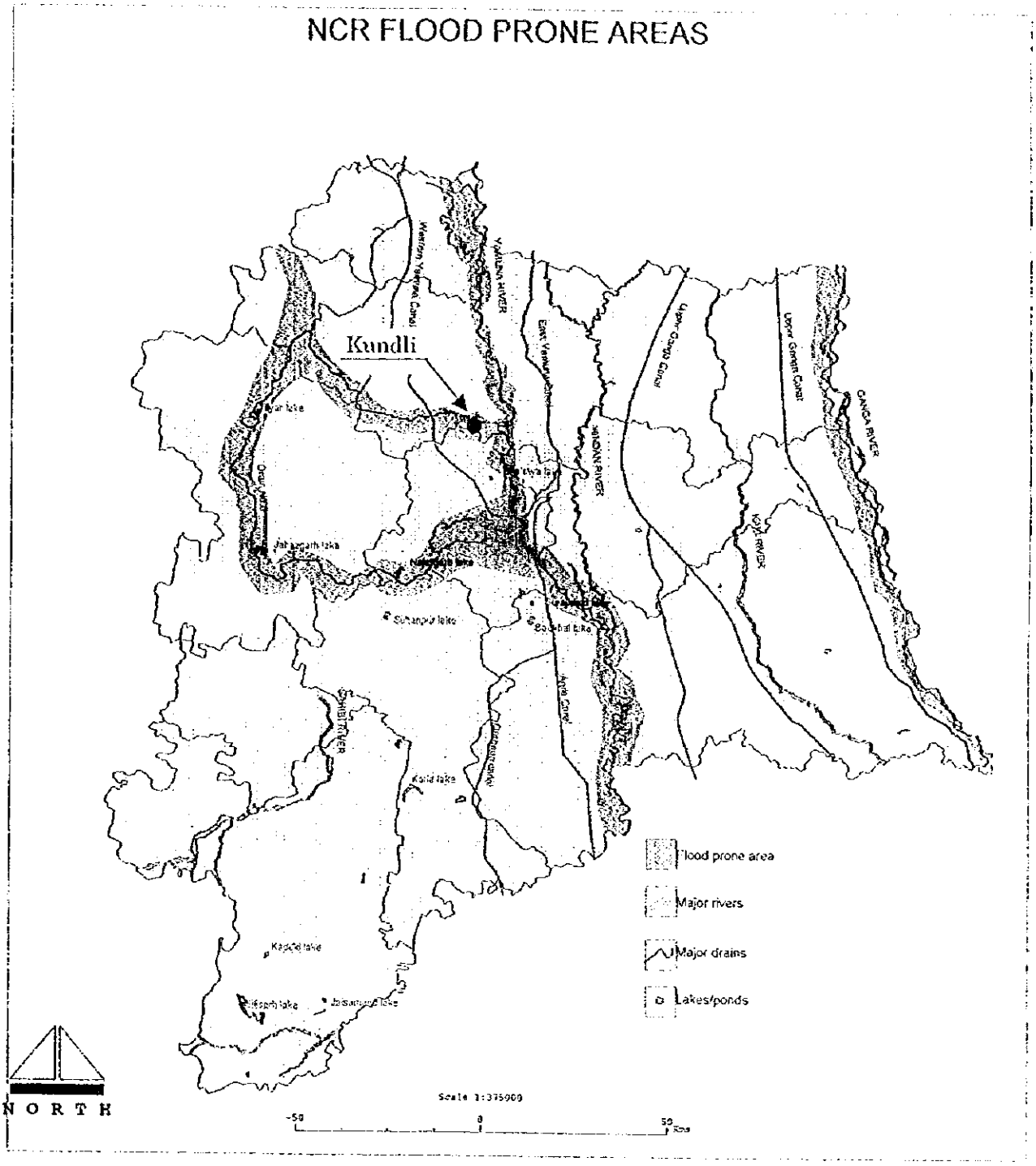


図４－４　ＮＣＲの洪水被災多発地域図

4－5　プロジェクト対象地区における自然条件から見た課題

高速道路建設予定地は、1年を通して気温の変化が激しく、夏と冬では最高・最低気温差は、40度にも及ぶ。そのため、路面舗装や橋梁のジョイント部など気温の変化で著しく影響を及ぼす箇所の設計には、十分な検討が必要となる。

ヒマラヤ山脈が水源であるYamuna川とHindan川が、ＫＧルートを南北に横切っている。

河川管理は、水資源省デリー河川局委員会が、行っており、河川水量・洪水位・洗掘などの過去の調査データを基にそれぞれの川の橋梁建設予定地を選定しなければならない。20年前の地形図上の川の形と現在の川の形を比較すると明らかに変化しており、橋梁建設予定地の選定にあたっては、洗掘や浸食の影響を受けそうな箇所は避け、護岸工設計においては予防方法を講じなければならない。

図４－４に示すようにＫＧルートの起点のKundli付近は、洪水被災多発地域で、デリーからほぼ同じ距離にあるGhaziabad, Faridabad, Gurgaonと比較して、かなり開発が遅れている。ＫＧルート建設を実現させるためには、Kundli周辺の治水整備も併せて検討する必要がある。

橋梁建設工事において、河川内に橋脚を造らざるを得ないため、掘削による河川汚濁の配慮が必要である。また、橋梁の部材となるコンクリートを造るためには、良質な水を必要とするため一般的に、地下水を汲み上げて供給しているようであるが、地盤沈下への配慮も必要である。

ＫＧルートの中間付近には、森林や野生のサルの生息地など、ルート選定に配慮しなければならない地域があり、高速道路の建設のためこのような豊かな自然を失うようなことは、できるだけ避けなければならない。

5．環境・社会予備調査

5－1　インド国における環境法制度と現状

5－1－1　環境行政

インド国において、最初に制定された環境法令は、英国植民地時代の1900年代初めの頃で、1950年頃の産業の発展に伴い発生する公害の対策のため、環境法令が見直された。

1972年に、環境行政の組織化を図り、環境にかかわる調査、提言のために政府の関係省、局や専門家による委員会が設立され1976年に組織の修正を行った。

さらに、1980年1月に環境保護策の確実な推進をめざし、現存の立法や行政機関のレビューやその強化策の提言のため、環境局が設立され、続いて1985年に環境、森林の保護管理計画の立案、新興、統合のための行政機構の中心として機能するように、環境局が昇格し、機能を充実させた環境・森林省となった。

現在、環境保護にかかわる法令で中央及び州政府で管理される主なものは、約30ある。その中でも重要な法令として、下記のようなものがある。

・森林保護法[Forest (Conservation) Act, 1980]
・野生動物保護法[Wild Life (Protection) Act, 1972]
・水質汚濁防止法[The Water (Prevention and Control of Pollution) Act, 1974]
・水質汚濁防止税法[The Water (Prevention and Control of Pollution) Cess Act, 1977]
・大気汚染防止法[The Air (Prevention and Control of Pollution) Act, 1981]
・環境防止法[The Environment (Protection) Act, 1986]
・公害賠償責任保険法[The Public Liability Insurance Act, 1991]

これらの法令は、中央や州の公害管理評議会などの複数の組織、工場のチーフ監督官などにより履行される。

デリー市では、大気汚染に影響を及ぼすアスファルト材の市内での製造を禁止しており、環境配慮には積極的な姿勢がうかがえる。

また社会、経済インフラ整備計画に係る環境影響調査を実施する際に配慮すべきと考えられる国際条約への加盟状況は下記のとおりである。

・ラムサール条約	(特に水鳥の生息地として国際的に重要な湿地に関する条約)	1975年
・世界遺産条約	(世界の文化遺産及び自然遺産の保護に関する条約)	1972年
・ワシントン条約	(絶滅のおそれのある野生動植物の種の国際取引に関する条約)	1975年
・国連海洋法条約	(海洋法に関する国際連合条約)	1982年
・バーゼル条約	(有害廃棄物の越境移動及びその処分の規制に関する条約)	1989年

5－1－2　環境影響評価の手続き

インド国において環境影響評価は、経済成長、社会開発を促進し環境保護と調和させるために包括的なＥＩＡが必要とされる。プロジェクト地域に森林が含まれる場合は、森林保護法のもとにＥＩＡが必要とされる。

事業者は技術・財政面の詳細なプロジェクト報告書とともに、環境評価のための質問書、環境管理計画(Environmental Management Plan)、環境影響申告書(Environmental Impact Statement)及びその他関連情報を事前に環境・森林省に提出する。環境影響申告書は事業者によるプロジェクトの影響評価であり、以下の項目が含まれる。

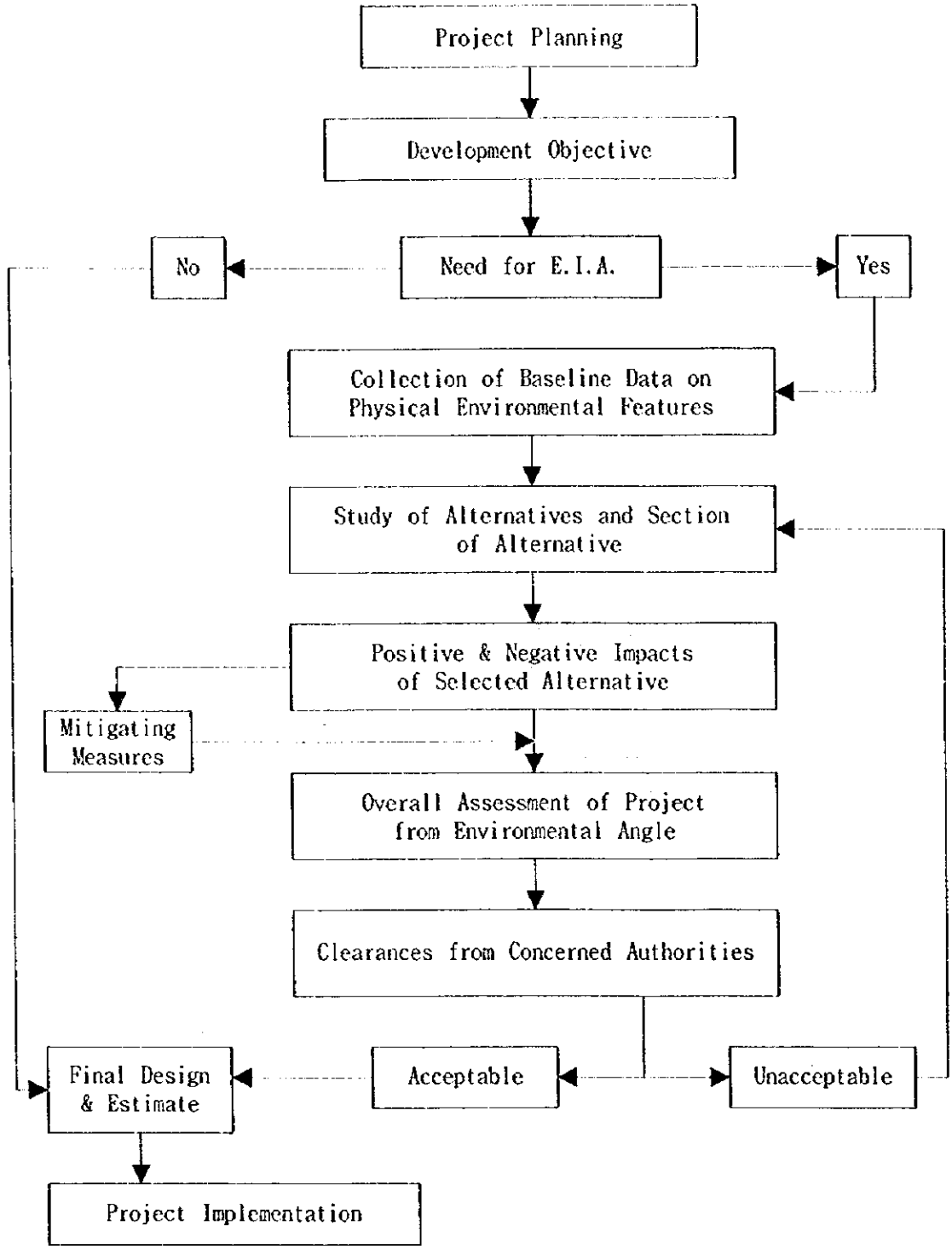
・土壌、水、大気への影響
・土地利用、森林、農業、漁業、観光、レクリエーションへの影響
・人口に対する短期・長期的影響を含む社会経済的影響
・健康への影響
・野生動物、特にインド固有種及び危機に瀕している種への影響
・環境保護対策を含めた費用便益分析

また、環境管理計画に含まれるものは以下のものである。

・環境への悪影響の防止、軽減対策
・プロジェクトによって移住を余儀なくされる人々の補償計画
・事故、災害発生時の対処計画
・必要な環境保護手段実施のためのモニター、フィードバック機構

プロジェクトの予備審査の後、様々な分野の専門家によって構成される環境評価委員会(Environmental Appraisal Committee)にかけられるが、このとき事業者は委員会への出席が求められる。さらに必要であれば実際にプロジェクトサイトでの環境影響評価が行われる。これらの結果を基に環境評価委員会はプロジェクトの認可あるいは却下を勧告する。

本プロジェクトの環境評価のフローチャートを、図５－１に示す。



出典；GUIDELINES FOR ENVIRONMENTAL IMPACT ASSESSMENT OF HIGHWAY PROJECTS THE INDIAN ROADS CONGRESS 1989

図５－１　環境評価　フローチャート

5－2　プロジェクト対象地区の社会環境の概況

インド国社会における社会環境を理解するには、カースト制度を念頭におかなければならない。これは、インド国民の83%が信じるヒンズー教社会における社会的身分制度を表す言葉として用いられることが多い。

一般的にバラモン(僧侶・司祭)、クシャトリア(王侯・戦士)、ヴァイシャ(一般人・商人)、シュードラ(農奴)の4階級層及びヒンズー教徒でありながらカースト制度に入ることさえ許されていないハリジャン(不可触民)に分けられる。

この身分制度は、ヴァルナ制といわれる古代・中世の身分制度から発達したもので、身分はそのまま職業の世襲につながり、生まれに基づく特定職業を伝統的に担う集団(ジャーティ)のことである。この身分制度は、4階層とハリジャンの5つに分けられるという単純なものではなく、その数は2,000～3,000あるとされ非常に複雑化されている。

ヒンズー教徒以外はヒンズーの社会制度を認めないから、彼らにはカーストもジャーティもない。インド国内にはヒンズー教徒以外の者もいるので、国民国家としてインド国は、カーストもジャーティも認める事はできない。

インド国憲法は非宗教国家、つまり世俗国家であることを宣言している。現行憲法第15条は、国家は法の下の平等を保障し、生まれによる差別をしてはならない旨規定している。その実現のために国家が指定カーストと少数民族に対し優遇措置を取ることは憲法第15条第4項で法の下の平等に反しない旨規定された。公務員の採用につき優遇枠があるので、公務員の約10%は指定カースト出身である。

プロジェクト対象地区の指定カーストや少数民族の生活区域が、土地収用、住民移転の対象となったときの彼らに与える影響は極めて大きいであろう。なぜなら、一般に彼らは昔から徒歩で移動できる範囲の狭い生活圏内の山林や河川から、燃料となる薪、きのこ、魚介類などの日常生活に必要なものを、流通機構に乗らずに得ることができ、そこから得たものの販売や、農産物の販売を行い、わずかな金銭を手にいれているからである。このような人々が移転の対象となった場合の生活環境の大きな変化は、物理的負担のみならず、強度の精神的負担になりかねない。

したがって住民移転計画において、移転先の慎重な調査、選択、移転後の十分なリハビリテーションなどを考慮して行わなければならない。

5－3　プロジェクト概要及びプロジェクト立地環境

現地踏査、資料解析などの結果に基づいてプロジェクト概要及びプロジェクト立地環境を作成した。作成にあたっては、ＪＩＣＡ開発調査環境配慮ガイドラインのフォーマットを使用した。結果を表5－1及び表5－2に示す。

5－3－1　プロジェクト概要について

計画道路は新規に建設される路線であり、高速道路としての機能をもっていて、有料化する予定である。なお、プロジェクトの実施による裨益人口及び計画諸元については一部不明である。事前調査においては、計画道路の予定ルートの限定は行っていないため、想定されるルートの範囲内で調査を行った。したがって、本格調査の初期段階では環境調査に先だって予定ルートを特定するルート選定作業が必要となる。

表5－1　プロジェクト概要「道路」

項　　目	内　　容
プロジェクト名	インド国首都圏高速道路整備計画調査
背　　景	デリー首都圏の一極集中に伴う弊害是正のために同国政府は1985年に首都圏計画委員会を設立し、交通網整備を最優先課題として2001年を目標とした、高速道路網計画を掲げた。
目　　的	要請に基づき、首都圏高速道路の建設に係るフィジビリティ調査を実施する。最適路線を選定する基準のひとつとするために環境影響評価を行う。
位　　置	デリー市中心部より東へ約20キロメートルの距離に位置するガジヤバードから北東に位置するメラットまでの約40キロメートル及び、デリー市中心部より北へ約20キロメートルの距離に位置するクンドリからガジヤバードまでの約40キロメートル。
実施機関	首都圏計画委員会　（ＮＣＲＰＢ）
裨益人口	不明
計画諸元	
計画の種類	(新設) ／ 改良
計画道路の性格	(高速) ／ 一般、 (都市部) ／ 地方部、 (平地部) ／ 山地部
計画年次／交通量	年　　台／時（　　台／日）
延長／幅員／車線数	Km　　m　　車線
道路構造	(盛土) ／ (高架) ／ 地下 ／ その他 （　　）
付属施設	インターチェンジ：　　箇所、料金所：　　箇所
その他特記すべき事項	特になし

5－3－2　プロジェクト立地環境について

プロジェクトは、首都圏の北東部から、北部にかけて計画されており、この地域には農地・森林・住宅地・工業地・商業地など様々な土地利用形態が、分布している。

大きな街にはそれぞれマスタープラン2001年計画があり、また新興工業地域もある。

首都圏の将来土地利用計画を図5－2に示す。

表5－2　プロジェクト立地環境「道路」

項目		内容
プロジェクト名		インド国首都圏高速道路整備計画調査
社会環境	地域住民 (居住者／先住民／計画に対する意識など)	立ち退き問題のこじれによる、プロジェクトの遂行に障害を来すおそれがあり、十分な配慮が必要となる。
	土地利用 (都市／農村／史跡／景勝地／病院など)	大部分が農地・林地を通過するのが、起点・終点は住宅地を通過する。
	経済／交通 (商業・農漁業・工業団地／バスターミナルなど)	工業団地付近を通過するので、インターチェンジを設け、生産物の流通に寄与する。
自然環境	地形・地質 (急傾斜地・軟弱地盤・湿地／断層など)	大部分が平野部で、洪水に対する配慮が必要となる。
	貴重な動植物・生息域 (自然公園・指定種の生息域など)	不明
公害	苦情の発生状況 (関心の高い公害など)	交通渋滞の発生に伴う大気汚染
	対応の状況 (制度的な対策／補償など)	不明
その他特記すべき事項		特になし

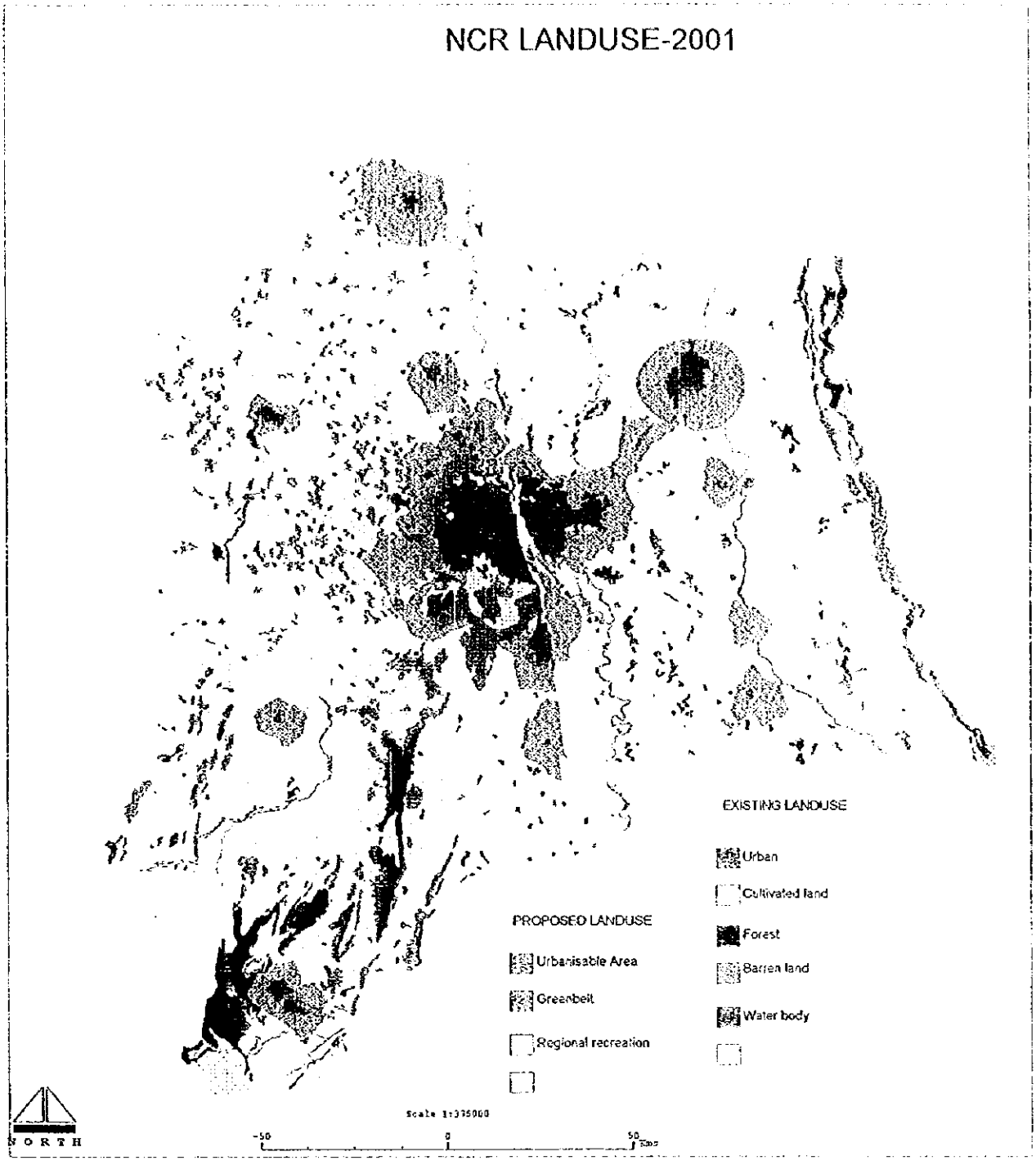


図５－２　ＮＣＲの2001年　土地利用計画図

5－4　スクリーニング・スコーピングの結果

インド国において大規模な開発プロジェクト、特別地区、環境を汚染すると見なされる事業の場合には包括的なＥＩＡが必要となる。

事前調査段階ではスクリーニング及びスコーピングは、ＫＧルートとＧＭルートについて行った。なお、事前調査のスクリーニング及びスコーピングはＪＩＣＡの環境配慮ガイドラインの環境項目、チェックリストを活用した。

本件調査で想定される環境への影響のうち、重大なものは下記のようなものがあげられる。

・道路・橋梁・インターチェンジ用地の収用に伴う住民移転

・高速道路の建設による従来の交通路の分断

・供用後の通過車両による排気ガス・騒音・振動・粉じんの発生

・自然保護地区に生息する動植物への影響

したがって、本格調査でのルート選定においては、高速道路建設地域の社会環境、自然環境を十分に調査・検討し、上述の環境影響を回避又は最小限にする配慮が必要である。

スクリーニング及びスコーピングの結果を表５－３及び表５－４に示す。また、表５－５に総合評価とインパクトが見込まれる環境項目に対する今後の調査方針を示す。

表５－３　スクリーニングの結果「道路」

環境項目			内　　容	評　定	備　　考（根拠）
社会環境	1	住民移転	用地占有に伴う移転（居住権・土地所有権の転換）	(有)・無・不明	新設、拡幅計画には住民移転が伴う
	2	経済活動	土地などの生産機会の喪失、経済構造の変化	(有)・無・不明	道路による経済インパクトは大きい
	3	交通・生活施設	渋滞・事故など既存交通や学校・病院への影響	有・無・(不明)	プロジェクトと学校などの相関位置未定
	4	地域分断	交通の阻害による地域社会の分断	(有)・無・不明	地域分断の可能性がある
	5	遺跡・文化財	寺院仏閣・埋蔵文化財などの損失や減少	有・無・(不明)	プロジェクトと文化財などの相関位置未定
	6	水利権・入会権	漁業権・水利権・山林入会権などの阻害	有・無・(不明)	水利権山林入会権の設定が不明
	7	保健衛生	ゴミや衛生害虫の発生など衛生環境の悪化	有・(無)・不明	特に考えられない
	8	廃棄物	建設廃材・残土、廃油、一般廃棄物などの発生	有・無・(不明)	建設廃棄物などの捨て場が不明
	9	災害（リスク）	地盤崩壊・落盤、事故などの危険性の増大	有・(無)・不明	災害発生の可能性は少ない
自然環境	10	地形・地質	掘削・盛土などによる価値ある地形・地質の改変	(有)・無・不明	ルート選定、道路構造などにより地形の大規模な改変の可能性がある
	11	土壌浸食	土地造成・森林伐採後の雨水による表土流出	有・無・(不明)	工事中の排水対策が不明
	12	地下水	掘削工事の排水などによる湧湯、浸出水による汚染	有・無・(不明)	水利地質図などによるチェックが必要
	13	湖沼・河川流況	埋立や排水の流入による流量・河床の変化	(有)・無・不明	橋梁部の橋脚による河床の影響がある
	14	海岸・海域	埋立や海況変化による海岸浸食や堆積	有・(無)・不明	本ケースには該当しない
	15	動植物	生息条件の変化による繁殖阻害、種の絶滅	(有)・無・不明	自然保護地区を通過する場合、動植物への影響が考えられる
	16	気　象	大規模構造や建築物による気温・風況などの変化	(有)・無・不明	変化なし
	17	景　観	造成による地形変化、構造物による調和の阻害	有・(無)・不明	高架橋、照明灯など構造物による影響がある
公害	18	大気汚染	車両や工場からの排出ガス、有害ガスによる汚染	(有)・無・不明	車両排ガスによる汚染
	19	水質汚濁	土砂や工場排水などの流入による汚染	有・無・(不明)	工事中の排水処理などが不明
	20	土壌汚染	粉塵やアスファルト乳剤などによる汚染	有・無・(不明)	施工法、粉塵などの発生程度が不明
	21	騒音・振動	車両・航空機・工場などによる騒音・振動の発生	(有)・無・不明	供用中の車両による騒音・振動
	22	地盤沈下	地盤変状や地下水位に伴う地表面の沈下	有・無・(不明)	基礎工事での地盤沈下対策が不明
	23	悪　臭	排気ガス・悪臭物質の発生	(有)・無・不明	排気ガス・悪臭物質による悪臭
総合評価：ＩＥＥあるいはＥＩＡの実施が必要となる開発プロジェクトか				(要)・不要	影響の考えられる項目が複数ある。

ＪＩＣＡ開発調査環境配慮ガイドライン「III. 道路」フォーマットを使用

表5－4　スコーピングチェックリスト「道路」

環境項目			評定	根拠
社会環境	1	住民移転	A	新設、拡幅計画には住民移転が、また不法占拠者の問題が伴う
	2	経済活動	A	道路による経済インパクトは大きい
	3	交通・生活施設	C	プロジェクトと学校などの相関位置未定
	4	地域分断	A	地域分断の可能性がある
	5	遺跡・文化財	C	プロジェクトと文化財などの相関位置未定
	6	水利権・入会権	C	水利権由来入会権の設定が不明
	7	保健衛生	D	特に考えられない
	8	廃棄物	C	建設廃棄物などの捨て場が不明
	9	災害(リスク)	D	災害発生の可能性は少ない
自然環境	10	地形・地質	B	ルート選定、道路構造などにより地形の大規模な改変の可能性がある
	11	土壌浸食	C	工事中の排水対策が不明
	12	地下水	C	水利地質図などによるチェックが必要
	13	湖沼・河川流況	B	橋梁部の橋脚による河床の影響がある
	14	海岸・海域	D	本ケースには該当しない
	15	動植物	A	自然保護地区を通過する場合、動植物への影響が考えられる
	16	気　象	D	変化なし
	17	景　観	B	高架橋、信号など構造物による影響がある
公害	18	大気汚染	A	車両排ガスによる汚染
	19	水質汚濁	C	工事中の排水処理などが不明
	20	土壌汚染	C	施工法、粉塵などの発生程度が不明
	21	騒音・振動	A	供用中の車両による騒音･振動
	22	地盤沈下	C	基礎工事での地盤沈下対策が不明
	23	悪　臭	B	排気ガスによる悪臭

ＪＩＣＡ開発調査環境配慮ガイドライン「III. 道路」チェックリストを使用

注1)　評定の区分

A：重大なインパクトが見込まれる

B：多少のインパクトが見込まれる

C：不明(検討をする必要はあり、調査が進むにつれて明らかになる場合も十分に考慮に入れておくものとする)

D：ほとんどインパクトは考えられないため、ＩＥＥあるいはＥＩＡの対象としない

表5－5　総合評価結果「道路」

環境項目	評　定	今後の調査方針
住民移転	A	計画対象地域の不法占拠者及び移転に係る現況調査 移転計画の把握・評価・提言
経済活動	A	計画道路周辺の地域経済及び産業経済活動に係る現況調査
交通・生活施設	C	計画道路周辺における学校・病院などの位置確認
地域分断	A	計画道路と地域／コミュニティ形成の状況調査
遺跡・文化財	C	計画道路周辺における遺跡・文化財の位置確認
水利権・入会権	C	ルート近傍における水利権・山林入会権の有無の調査
廃棄物	C	工事中の廃棄物処理計画の検討及び提言
地形・地質	B	計画地における価値ある地形・地質構造有無の確認 断層有無の確認、過去の地震による災害状況確認
土壌浸食	C	土壌、地形・地質調査、土地利用現況調査、 工事中におけるの土壌流出対策検討、提言
地下水	C	計画地域の水理地質図などによる水脈、地下水位の確認
湖沼・河川流況	B	計画橋梁対象河川の流況現況調査
動植物	A	自然保護地区を中心とした動植物の現況調査
景　観	B	フォトモンタージュなどによる景観予測調査
大気汚染	A	大気汚染の現状把握調査、対策の提言
水質汚濁	C	工事中の水処理計画検討、提言
土壌汚染	C	排出ガス、粉塵などによる土壌汚染の予測調査、提言
騒音・振動	A	騒音・振動の現状把握調査、提言
地盤沈下	C	基礎工法の検討、提言 計画地域の地下水位確認
悪　臭	B	排気ガスによる悪臭の現状把握調査、提言

注1)　評定の区分

A：重大なインパクトが見込まれる

B：多少のインパクトが見込まれる

C：不明(検討をする必要はあり、調査が進むにつれて明らかになる場合も十分に考慮に入れておくものとする)

5－5　環境関連データの入手可能性

事前調査では、環境・森林省の担当官に環境関連について聞き取りを行うべく、7月8日の面談を計画したが、急遽当日が祝日になり面談が実現しなかったため、必要と思われるデータを入手することができなかった。本格調査で、下記の資料の入手が可能と思われる。

資　料	入手場所
1．環境影響評価ガイドライン	環境・森林省
2．環境影響調査通達	環境・森林省
3．ハイウェイ計画環境影響評価ガイドライン	The Indian Roads Congress
4．ＯＥＣＦ環境ガイドライン	ＯＥＣＦ
5．土地収用補償に関する法律	Eastern Book Company
6．土地収用法	Eastern Book Company
7．インド国の環境法と方針	Armin Rosencran 2
8．環境行政について	中央汚染対策委員会
9．自然保護区について	ＰＷＤ

5－6　本格調査の環境上の留意事項

自然環境において、プロジェクト対象地区の大部分が平坦なため、集中的な豪雨が発生した場合、短時間での雨水排水が困難である。したがって、洪水に対する検討が必要となる。

また、手つかずの自然が残っており、そこに生息する動物や、繁殖している植物の調査も十分に行い、生態系を崩さないような配慮をしなければならない。

高速道路建設で問題となるひとつに地域分断があげられる。有料道路を念頭において造られた場合、高速道路により分断される相互のアクセスは、所々に設けられた地下道だけとなる可能性があり、経済活動に少なからず影響を及ぼす。影響を軽減させるためには、地域住民にも、本プロジェクトの重要性の説明を行い理解を求め、予定される地下道・側道の位置及び延長の選定などに、住民の意見を十分反映させるよう努力する必要がある。

5－7　本格調査におけるＥＩＡの内容、実施体制及びスケジュール

5－7－1　ＩＥＥ・ＥＩＡの内容

下記の項目について調査を行う。

(1) ＩＥＥの内容　　・社会環境概要
　　・自然環境概要

・大気汚染現況
・水質汚濁現況
・騒音、振動現況
・電波障害現況

(2) ＥＩＡの内容
・社会環境概要
・大気汚染現況
・水質汚濁現況
・騒音、振動現況
・電波障害現況
・湖沼、河川流況
・施工期間中環境影響分析
・供用期間中環境影響分析
・都市生態系環境影響分析
・住民移転計画
・環境汚染防止対策処置
・環境経済損益分析、感度分析

5－7－2　実施体制

前項でも述べたように、大規模な開発プロジェクトは、Ｆ／Ｓ段階で環境への影響評価を受けなければならず、初期環境調査（ＩＥＥ）及び環境影響評価（ＥＩＡ）の実施は、ＪＩＣＡスタディーチームがＩＥＥ・ＥＩＡに精通したローカルコンサルタントに委託して行うこととする。

したがって、本格調査団の環境担当団員は、ローカルコンサルタントがインド国の法制度に基づいて行う調査を助言・監督すること、調査結果の検討、取りまとめなどが主な業務内容となる。

調査の実施にあたっては、ＪＩＣＡ調査団とカウンターパート機関（ＮＣＲＰＢ）、ローカルコンサルタント、環境関連機関との間に十分な協力体制を確立することは勿論のこと、ステアリング・コミッティーからの支援、大学や研究機関から情報を提供してもらうことも重要である。

5－7－3　スケジュール

本格調査のスケジュールは、調査開始より最終報告書の提出まで15か月である。初期環境調査の結果は4か月目に提出されるプログレス・レポート（1）に挿入して、同国政府に説明し、

協議する。

環境影響評価調査は、第２次現地調査を行う６か月目に速やかに現地入りし、環境に関する資料収集、環境関係機関からの情報収集、予定ルートに対する環境基礎調査、ローカルコンサルタントが行うＥＩＡ調査の監督・指示、報告書の取りまとめなどを行う。

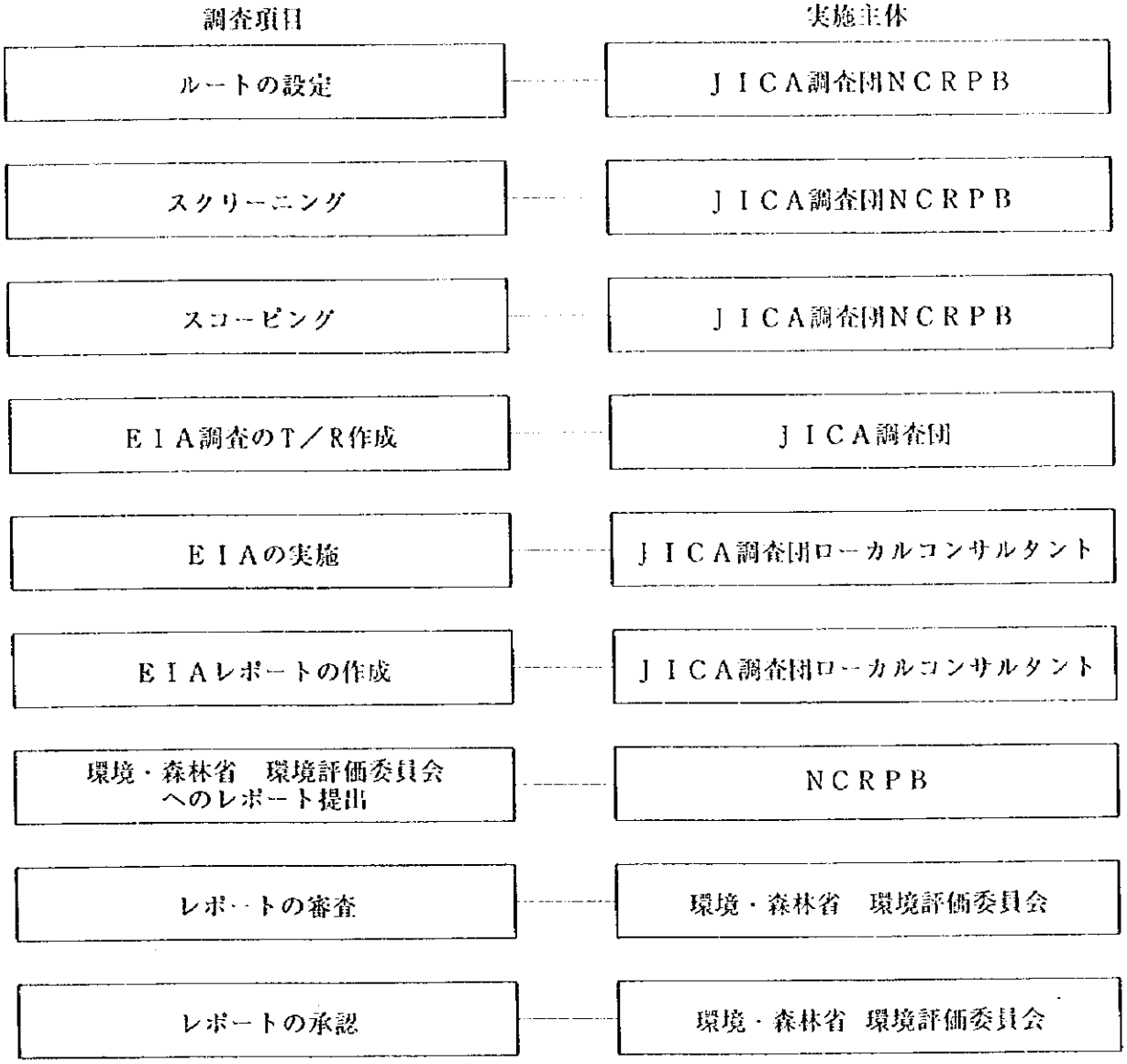


図５－２　ＥＩＡ調査項目と実施主体との関係

6．インド国政府からの要請書（Terms of Reference）

Smt. Sunita Chhibba
Under Secy (Japan)

भारत सरकार Government of India
वित्त मंत्रालय Ministry of Finance
आर्थिक कार्य विभाग Department of Economic Affairs

..... the 10th July, 92

Dear Mr. Hida,

Subject:-Feasibility Study and Project Preparation covering Detailed Designs for the Expressway Corridors in the National Capital Region.

Please find enclosed a copy of the above mentioned proposal for availing technical and financial assistance from JICA.

2. We would be grateful if you could kindly consider the proposal for development study.

Yours sincerely

S. Chhibba

(SUNITA CHHIBBA)

Mr. T. Hida,
Director,
Embassy of Japan
Chanakyapuri,
New Delhi.

REQUEST FORMAT FOR THE DEVELOPMENT STUDY

I. CONTENTS OF THE REQUEST

1. Basic Features

i) Project's Name	:	Feasibility Study and Project Preparation covering Detailed Designs for the Expressway corridors in the National Capital Region.
ii) Field of Project	:	Transportation (Roads)
iii) Name of the Implementing Agency	:	State Govts. of Uttar Pradesh, Haryana and NCR Planning Board.
2. Outline and the aim and objectives of the project.	:	The Regional Plan-2001 for NCR has identified 'Transport' as one of the key sectors of development in the National Capital Region. The Transport Sector Plan, inter-alia, include proposals relating to development of three Expressways namely Delhi-Ghaziabad-Meerut; Sonipat-Panipat on parallel alignments and Faridabad-Noida-Ghaziabad (ADB on New alignment by 2001 AD (4-lane divided highway initially with full access control and all intersections to be grade separated with 100m R.O.W)

The main objectives of the study are :

a) Traffic characteristic and route study on the above mentioned Expressways, which includes the alignment selection, investigations covering alternative options for take off, exit and other obligatory points.

b) Detailed Feasibility studies of the Project of Expressways with total facilities based on preliminary design and to

		establish the economic and financial viability of such proposals. c) Preparing a project of the needed development works after detailed field surveys, sub soil investigations etc..; and d) Preparation of Detailed Designs, Drawings, work specifications, prequalifications and bid documents fit for tendering and executing the project.
3. Priority given to the Project among other projects requested to Japan	:	The above mentioned project is the first of its kind projected to Japan for their assistance by the NCR Planning Board.
4. Requested Timing and duration of the survey	:	The time duration for Feasibility and for Detailed Engineering report shall be 9 and 12 months respectively.
5. Major fields to be covered by the Development study	:	Transportation and in particular Highways.
6. In case Project is to be implemented, state cost evaluation, sources of finance and Proposed management and operational programmes.	:	Part of the studies.
7. History of request regarding past request to Japan or other country and International organisations	:	Nil.
8. Third party involvement	:	Nil.
9. Need of Technical cooperation	:	To conduct Fasibility and Detailed Engineering study for the construction of Expressways in the NCR.

10. Availability of information and data regarding the project and survey (such as Topographical map, Climatic data etc.)	:	A prefeasibility study conducted by a consultant is available.

II. BACKGROUND INFORMATION

1. Name of overall or master deyelopment plans and development programme related to the project in request	:	Regional Plan - 2001 NCR Transport sector development
2. The aims and objectives of the above development plans and programmes and give their profiles and outlines.	:	With a view to containing the growth of Delhi within manageable limits and bringing about balanced regional development, the National Capital Region Planning Board (NCRPB). was constituted through an Act of Parliament in 1985. The NCR Planning Board prepared Regional Plan - 2001 for NCR which envisages a package of policies and strategies for achievinn the above objectives. The Plan is aimed at progressive deconcentration of economic activities away from Delhi and their dispersal to various parts of the NCR so as to contain Delhi's population size within manageable limits by 2001 AD. The plan envisages a balanced development of the region and has identified 8 towns and complexes with growth potential for induced development to accommodate larger economic activities and, to reduce pressure of migration to Delhi.
3. Plan period	:	The Regional Plan for NCR is for the perspective year 2001 AD and notified since 23rd January, 1999

4. Role and status of the project under request to Japan in the overall (or) master development plans	:	i) The project is to provide a fast transport linkage between priority towns of the Region and Delhi to promote the objective of balanced development of the Region. ii) It will provide a bypass facility to the long route traffic which does not have business in Delhi but has to pass through it adding to the congestion on Delhi roads.
5. Third party contribuion (please give financial and technical cooperation by other donors to the Overall, development plan and their details)	:	Nil.
6. Other relevant information	:	Copy of Regional Plan-2001 for National Capital Region is annexed.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

APPENDIX - I

TERMS OF REFERENCE FOR ENGAGING CONSULTANCY SERVICES FOR PREPARATION OF PROJECT FOR EXPRESSWAYS IN THE NATIONAL CAPITAL REGION (NCR)

PART - I

INTRODUCTION

1.0 With a view to containing the growth of Delhi within manageable limits and bringing about balanced regional development the National Capital Region Planning Board (NCRPB) was constituted through an Act of Parliament in 1985. .The National Capital Region Planning Board prepared Regional Plan-2001 for the NCR which recommends a package of policies and strategies for achieving the objectives of the NCR. The Regional Plan has identified 'Transport' as one of the key sectors of development in the regional context.

To come out with a plan of Transport Sector for the NCR, the NCRPB undertook a study of Traffic and Transportation of the entire region through an outside Consultant (ORG - Baroda). The Transport Sector Plan which came out on the basis of this study, includes proposals for the improvement of Transport network and system (both Road and rail) for effective and efficient movement of traffic, formulation of policies and strategies to promote development, through, inter alia, fast interaction between Delhi and the selected economic development with a view to reduce over-burden of population on Delhi's infrastructure.

2.0 The Transport Sector Plan, inter-alia, included proposal relating to development of following expressways by 2001 AD (4-lane divided highway initially with full access control and all intersections grade-separated with 100 m R.O.W.).

On parallel alignment to :

i) Delhi - Ghaziabad - Modi Nagar - Meerut, and

On new alignment to :

ii) Faridabad - Noida - Ghaziabad

NCRPB has also conducted a pre-feasibility study for these corridors through the aegis of Consulting Engineering Services Ltd., India, which the Consultants may like to review.

PART - II

TERMS OF REFERENCE :

1.0 OBJECTIVES OF THE STUDY :

In order to implement the above proposals a Project Report is to be prepared for each Expressway covering relevant details to the extent necessary for establishing the economic viability and cost recovery to pose for funding to ADB/World Bank/Private and Public Enterprises.

The main objectives of the proposed consultancy services is the preparation of feasibility study report followed by detailed project with the related documents for development of expressways in the National Capital Region with the most appropriate proposals which are technically feasible and economically viable. Inter-alia, this will include, but may not be restricted to the following:

i) Alignment selection investigations covering alternative options for take off, exit and other obligatory points fixing expressway corridor & transferring the selected alignment on ground;

ii) Conducting feasibility studies of the expressways with total facilities based on preliminary design and to establish the economic and financial viability of such proposals,

iii) Preparing a project of the needed development works after detailed field surveys, subsoil investigations etc.; and

iv) Preparation of detailed designs, drawings, work specifications prequalification and bid documents fit for tendering and executing the project.

2.1 SCOPE OF CONSULTANCY SERVICES

The Scope of Consultancy Services can be divided into feasibility study, project preparation and tender documents. Though each stage has its own objectives to fulfill, some of the activities may overlap each other. The activities to be carried out by the consultant under each stage are brought out hereunder.

2.2 FEASIBILITY STUDY

The activities will include, but may not be restricted to, the following :

i) Review of all available reports/information about such projects, and the project influence area and assess the impact, on demand for transport, of the development plans in the influence area.

ii) Assessment of land acquisition requirements for acquiring desired right of way (ROW) along proposed expressway alignments and approaches.

iii) Assessment of real estate development alongside expressways with related matters, including access points.

iv) Environmental impact assessment clearance aspects and procedures and protection measures.

v) Assessment of land holding through land records/revenue maps in respect of established land acquisition requirements for expressways, approaches, connecting links and interchanges, particulars about ownership, land use, religious places, graveyards, forests, trees, suggestions for land connectivity due to land severance by way of underpasses etc.

vi) Topographic surveys, including alignment plans longitudinal sections and cross sections (at one km intervals) and determine the vertical and horizontal alignment of the expressway and establish horizontal control points, bench marks and reference beacons as required. Assessment of right-of-way to initiate action for right of way acquisition.

vii) Provide Socio-Economic Profile of the project influence area covering socio-economic conditions, settlement pattern, available infrastructure and growth potential of economic activity.

viii) Traffic surveys covering O.D. surveys, ADT surveys covering traffic count, congestion and bottleneck locations, speed survey/travel time survey, axle load and type survey, assessment of possible traffic diversions realistic forecasting of future growth and expressway traffic circulation plans.

ix) Assess the alignment options on the basis of potentially divertible traffic determined from available data and traffic surveys, land acquisition costs, restrictions on the alignment if any, preliminary cost of major/minor bridges, interchanges, road construction in costs calculated on the basis of typical cross sections and prevailing unit prices and economic and environmental considerations;

x) Alignment selection investigations, covering alternative options for take off, exit and other obligatory points, and recommend the most suitable alignment.

xi) Prepare land acquisition plans

xii) Determine locations of interchanges for expressway alternative and end points for the recommended alignment, including planning and designing of dispersal schemes alongwith cost implications.

xiii) Identification of bottleneck stretches and detailed investigations for alternative proposals with related design.

xiv) Soil investigations for evaluating natural subgrade for ground by digging test-pits at interval of 1 km along proposed expressway alignment or at closer intervals in problematic stretches and approaches based on various field and laboratory tests to the extent necessary for detailed pavement design.

xv) Preliminary design of interchanges covering their type layout, traffic assignment, drainage aspects, span arrangements and general arrangement drawings.

xvi) Soil and material investigations for evaluating the available construction materials in the near vicinity for different purposes, such as, fill materials for subgrade, embankment and backfill around structures, subbase, base course, asphalt coarse, wearing coarse and aggregates for concrete work in structures, so as to achieve maximum material economy in development of expressways. These investigations would comprise, identification of material sources listing of existing quarries, their lead from expressways, quantum of materials to be available to meet the requirement of the project work, laboratory testing for ascertaining their structural suitabilities, their evaluation for different construction works to the extent necessary for estimating construction costs. The report should indicate alternative economically viable sites for meeting additional balance requirement of construction materials.

xvii) Following an analysis of meteorological and hydrological investigations and records, supplemented by field investigations, and the study of existing cross drainage facilities nearby, determine the waterway of High Flood levels, scour depths for cross drainage works, their location and establish the embankment heights and pavement levels for the expressway. For major crossings the report shall indicate a brief review of the model studies or other reports relating to existing cross drainage works.

xviii) Carry out sub-surface investigations at all bridge locations to determine the depth and type of foundations required in each case.

xix) Preliminary design of pavement structure appropriate for the existing subgrade soils, aggregates and traffic loading and development of alternative pavement types.

xx) Establish and recommend appropriate design standards for two expressway corridors giving justification for the same and recommend standard typical cross sections for pure fill, pure cut and part cut and fill sections.

xxi) Study the drainage requirements both surface and sub-surface along the alignment of expressways and make suitable recommendations for improving the same.

xxii) Preliminary design of operational aspects of expressways appurtenances covering interchanges, a modern toll plaza, supported by traffic inflow and outflow, lighting, rest areas, fuel filling stations, toll-way maintenance depot, fencing for control of access, type of weigh bridges and their locations, crash barriers, median treatment, landscaping, environment protection measures, traffic surveillance and communication systems including telephone booths, variable message sign boards etc.

xxiii) Preliminary cost estimates within a tolerance of +/- 20% for developing expressways including maintenance costs scheduling break-up into foreign component, local component and taxes, as per I.C.B. requirements.

xxiv) Economic evaluation and sensitivity analysis, would be carried out under 'with' and 'without' project situations by varying economic costs, economic benefits and both, under different traffic scenarios (i.e. optimistic, pessimistic and Normal scenarios)

xxv) Legal aspects of cost recovery through levy of tolls.

xxvi) Financial Plan and Appraisal covering the various options of cost-recovery based on appropriate terms for loan finance through National and international funding institutions, private funding agencies and commercial banks etc.

xxvii) Terms and conditions for posing these as toll based projects for private financing on a turnkey basis.

xxviii) Prepare implementation strategies, phases for construction, project programmes and proposals for organisational set up to implement the project and also to identify contractual package for implementation.

xxix) Feasibility study will involve submission of following reports :

a) Main report covering the study methodology, traffic studies, soil investigations, alignment section process, cost estimates, funding alternatives including the terms and conditions for private sector investments, economic and financial analysis, conclusions and recommendations.

b) Design report, covering land use plans, survey and investigation data, proposed design standards and specifications, preliminary design covering pavements, culverts, bridges, interchanges, toll plazas, lay byes and rest places.

c) Drawings containing location maps, land acquisition plans, typical cross sections, preliminary drawings for typical culverts, bridges and interchanges.

2.3 PROJECT PREPARATION :

The activities to be performed by the consultant will, inter-alia, include but may not be restricted to the following :

i) Conduct an accurate instrument survey of the area for collecting all information for designing all developmental works, and establish horizontal controls on the ground for the final centre line of the road through reference pillars fixed in concrete, and vertical control through a series of bench marks all along the road. All surveys and investigations should be as per recommendations contained in IRC : SP : 19.

ii) Conduct a detailed soil and materials survey for purposes of pavement design and for ascertaining the location, availability and suitability of road construction materials and the quantum of material from each source.

iii) Conduct geo-technical investigations at locations where bridges/high embankments are proposed as per the guidelines of Ministry of Surface Transport.

iv) Based on the detailed surveys and investigations, prepare detailed designs and working drawings for expressway and appurtenances covering interchanges, toll plazas, lighting, rest areas, fuel filling stations, tollway maintenance depots, weigh bridges, land scaping, traffic surveillance and communication system, pavement and cross drainage structures.

v) Prepare Bill of Quantities for the proposed works and detailed cost estimates. The rates should be based on detailed analysis of rates keeping in view the modern construction methods.

vi) Make an environmental impact assessment of the proposed works and suggest remedial measures, if any and outline environmental clearance aspects and procedures. Prepare total plan for landscaping along the routes and suggest type of and number of plants, upkeep etc.

vii) Assist during execution for correction/modification of design/drawings, if so required, as a result of any deviations at site conditions.

viii) Review the implementation strategies, phases for construction, equipment requirement and their availability within the country and identify contractual packages for implementation within the time frame.

ix) Suggest technical quality assurance measures and post-construction operational aspects covering maintenance manual.

x) Prepare draft report on Project preparation in four volumes as follows :

a) Main report covering the methodology, details of all the field surveys and investigations, details of proposed improvements, environmental impact assessment etc.

b) Design report covering design of pavement, bridges, culverts, road intersections, retaining walls, traffic guidance system, roadside appurtenances etc., as also details of the material surveys conducted by the Consultant including detailed design calculations.

c) Bills of Quantities and detailed cost estimates.

d) Drawing Folder-containing working drawings for all the proposed improvement works on the lines and to the scales recommended by the relevant standards.

2.4 SPECIFICATIONS AND BID DOCUMENTS

The specifications for the various items of work should be as the Ministry's specifications for Road and Bridge Works (latest revised edition). For any item not covered in the above book, the consultant should propose the appropriate specifications. These should also include equipment planning, scheduling of various construction activities and maintenance plan (manual) etc.

The consultant shall specify in the tender documents the method of construction and technology to be adopted at the time of construction, keeping in view the Indian scenario, covering details of equipment including their phase-wise requirements.

3. REPORTS AND DOCUMENTS

The Consultant shall submit to the client the following reports and documents at the time and in the number of copies indicated against each :

i) Monthly works programme covering the activities envisaged during the each month to be submitted by the 20th of preceding month in five copies.

ii) Progress report in adequate detail indicating the physical progress of the various items of work, for each month, to be submitted latest by the 10th of the following month, in five copies.

iii) Inception report within one month of the commencement of services outlining detailed work program, location and duration of traffic surveys, methodology proposed to meet the terms of reference, besides the design standards proposed.

iv) Draft Feasibility Report, in three volumes at the end of five months from start of work. This should be submitted in ten copies.

v) Final Feasibility Report, in three volumes and in 25 copies, to be submitted within on month of the receipt of comments of the client on the draft report. This will incorporate all revisions deemed relevant following receipt of the comments and any further discussions with the client.

vi) Draft Reports on project preparation, in four volumes to be submitted within ten months of start of Phase II work This should be submitted in ten sets.

vii) Final Reports on project preparation, in four volume and in 50 copies, to be submitted within two months on the receipt of the comments of the clients on the draft reports.

viii) Specifications and bid documents, in 50 sets to supplied to the client within one month of submission the final report on project preparation.

7. Scope of Works (S/W)

SCOPE OF WORK

FOR

THE FEASIBILITY STUDY ON THE CONSTRUCTION OF EXPRESSWAYS IN THE NATIONAL CAPITAL REGION IN INDIA

AGREED UPON BETWEEN

NATIONAL CAPITAL REGION PLANNING BOARD

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

DELHI, 1 JULY, 1998

MR. YUSUKE KAJIURA
LEADER,
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY

MR. R.C. AGGARWAL
MEMBER SECRETARY
NATIONAL CAPITAL REGION
PLANNING BOARD

DR. NIVEDITA HARAN
DIRECTOR (DD)
M/O URBAN AFFAIRS & EMPL.
GOVT. OF INDIA

MR. DIWESH SHARAN
DY. SECRETARY,
DEPARTMENT OF ECONOMIC
AFFAIRS,
MINISTRY OF FINANCE
GOVT OF INDIA

I. INTRODUCTION

In response to the request of the Government of India (hereinafter referred to as "GOI"), the Government of Japan has decided to conduct "Feasibility Study on the Construction of Expressways in the National Capital Region" (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical Cooperation programs of Japan will undertake the Study in close Cooperation with the authorities concerned of GOI.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVE OF THE STUDY

The objective of Study is to conduct a feasibility study for the proposed expressways i.e.(i) Kundli-Ghaziabad and (ii) Ghaziabad-Meerut a total length of approximately 80 Km.

III. STUDY AREA

The Study area shall cover the following proposed routes:

(i) Kundli-Ghaziabad (K-G Expressway) and
(ii) Ghaziabad-Meerut (G-M Expressway)

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following items. It should be noted that the details of each items would be determined during the Study based upon the data availability:

[Feasibility study (Target Year 2004 for opening to traffic)]

1. Review of existing reports and relevant information on the Study area

2. Socio-economic study

(i) Collection and analysis of existing socio-economic data and information in the influenced area

(ii) Analysis of existing landuse pattern and evaluation of urban and rural development plans and infrastructure in the influenced area

(iii)Forecast of future socio-economic development in the influenced area

3. Evaluation of planning and design standard of road

4. Road inventory survey

5. Traffic condition survey

6. Initial Environmental Examination (IEE)

7. Future traffic demand forecast

8. Natural condition and Engineering surveys
   (i) Topographic survey
   (ii) Geological survey
   (iii) Hydrological and meteorological survey

9. Establishment of design standard and criteria of road and structures considering IRC/MOST Guidelines.

10. Preliminary design

11. Assessment of land acquisition requirements and preparation of land acquisition plan

12. Cost estimation for land acquisition, construction and maintenance and operation

13. Assessment of real estate development around the proposed interchanges

14. Social and Environment Impact Assessment (SIA, EIA)

15. Planning for operation and management

16. Economic and financial analysis

17. Formulation of project implementation plan

18. Overall evaluation and recommendations

V. STUDY SCHEDULE

The Study shall be implemented in accordance with the attached tentative study schedule shown in APPENDIX. The schedule, including report submission date stated in the next clause (VI), is tentative and subject to be modified when both parties agree upon and any necessity that arises during the course of the Study.

VI. REPORTS

JICA shall prepare and submit the following reports in English to GOI, National Capital Region Planning Board hereinafter referred to as NCRPB.

1. Inception Report
   Twenty (20) copies
   Within one (1) month after the commencement of the Study

2. Progress Report 1
   Twenty (20) copies
   Within four (4) months after the commencement of the Study

3. Progress Report 2
   Twenty (20) copies
   Within ten (10) month after the commencement of the Study

4. Interim Report
   Twenty (20) copies
   Within eleven (11) months after the commencement of the Study

5. Draft Final Report
   Twenty (20) copies
   Within fourteen (14) months after the commencement of the Study
   GOI (NCRPB) will provide JICA with its comments
   Within one (1) month after the receipt of the Draft Final Report

6. Final Report
   Sixty (60) copies
   Within one (1) month after the receipt of the comments on the Draft Final Report

VII. UNDERTAKING OF THE GOVERNMENT OF INDIA

1. To facilitate smooth conduct of the study, GOI shall take the following necessary measures:

(1) to secure the safety of the Japanese study team;

(2) to permit the members of the Japanese study team to enter, leave and sojourn in India for the duration of their assignment therein and exempt them from alien registration requirements and consular fees;

(3) to exempt the members of the Japanese study team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into and out of India for the conduct of the Study;

(4) to exempt the members of the Japanese study team from income taxes and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with implementation of the Study;

(5) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into India from Japan in connection with the implementation of the Study;

(6) to secure permission for entry into private properties and restricted areas for the implementation of the Study;

(7) to secure permission for the Japanese study team to take all data and documents including maps, photographs related to the Study out of India; and

(8) to provide the medical services as needed. Its expenses will be chargeable on the members of the Japanese study team.

2. GOI shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of Japanese study team.

3. NCRPB shall act as a counterpart agency to the Japanese study team and also as a co-ordinating body in relation with other governmental and non-governmental organisations concerned for the smooth implementation of the Study.

4. NCRPB shall provide, as its own expense, the Japanese study team with the followings, in ~~Cupertino~~ Cooperation with other agencies concerned:

(1) Available data and information related to the Study, including aerial photographs and maps;

(2) counterpart personnel;

(3) suitable office space with necessary equipment in Delhi and at the site of the Study

(4) Credentials or identification cards; and

(5) Appropriate number of vehicles with drivers.

VIII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures;

(1) to dispatch, as its own expense, the study team to India; and

(2) to pursue technology transfer to the Indian counterpart personnel in the course of the Study.

IX. CONSULTATION

NCRPB and JICA shall consult with each other in respect of any matter that may arise from or in connection with the Study.

APPENDIX

TENTATIVE SCHEDULE OF THE STUDY

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Work in India																
Work in Japan																
Reports	△ IC/R			△ P/R1					△ P/R2		△IT/R			△ DF/R	△ F/R	

【NOTE】 IC/R : Inception Report, P/R : Progress Report, IT/R : Interim Report, DF/R : Draft Final Report, F/R : Final Report

8. Minutes of Meeting (M/M)

MINUTES OF MEETING

UPON

THE SCOPE OF WORK

FOR

THE FEASIBILITY STUDY ON THE CONSTRUCTION OF EXPRESSWAYS IN THE NATIONAL CAPITAL REGION IN INDIA

AGREED UPON BETWEEN

NATIONAL CAPITAL REGION PLANNING BOARD

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

DELHI, 1 JULY, 1998

MR. YUSUKE KAJIURA
LEADER
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY

MR. R. C. AGGARWAL
MEMBER SECRETARY
NATIONAL CAPITAL REGION
PLANNING BOARD

DR. NIVEDITA HARAN
DIRECTOR (DD)
M/O URBAN AFFAIRS & EMPL.
GOVT. OF INDIA

MR. DIWESH SHARAN
DY. SECRETARY,
DEPARTMENT OF ECONOMIC
AFFAIRS,
MINISTRY OF FINANCE
GOVT. OF INDIA

The Preparatory Study Team (hereinafter referred to as the "Team") for the Feasibility on the Construction of Expressways in the National Capital Region in India, (hereinafter referred to as the "Study"), organised by the Japan International Cooperation Agency (hereafter referred to as "JICA") headed by Mr. Yusuke KAJIURA, visited India, from June 22nd, 1998 to July 1st, 1998.

The Team exchanged views and had a series of discussions on the Scope of Work with the representatives of National Capital Region Planning Board (hereinafter referred to as "NCRPB") and other organisations concerned. (See APPENDIX-1 for the attendants list).

Apart from finalising the Scope of Work, both sides agreed or confirmed the following points for the smooth implementation of the study:

I. SCOPE OF THE STUDY

1.1 Study Area

It was agreed that the Study should cover the following routes:

i) Kundli-Ghaziabad (K-G Expressway) and
ii) Ghaziabad-Meerut (G-M Expressway).

1.2 Pre-feasibility study

The team identified that traffic data which satisfies pre-feasibility requirements for the proposed routes, is available from the existing reports, and so it was agreed that a pre-feasibility study need not be conducted.

1.3 Target Year

It was agreed that the target year of the Study or the year for opening the Expressways for traffic should be 2004 A.D., considering the time required for land acquisition procedures and for construction work.

1.4 Traffic demand forecast

It was agreed that the traffic demand forecast should be implemented based on the following assumptions;

i) F-N-G Expressway is in use and
ii) Kundli-Sonipat-Panipat Expressway is not in use.

1.5 Economic & Financial Analysis

NCRPB requested to undertake the Economic and Financial Analysis for implementation of the project on Build, Own, Operate and Transfer (BOOT) basis/other financial and managerial alternatives (including sensitivity analysis).

1.6 Projection/Forecast Period

NCRPB requested that the projection/forecast period should be on decade to decade basis, covering the concession period of BOOT basis which is thirty (30) years approximately. The Team took note of the request, and it was agreed that the period should be finally decided at the commencement of the Study between JICA Study Team and NCRPB.

1.7 Linkages with Existing Road Network

It was agreed that this item should be covered in Road inventory survey and Preliminary design.

1.8 Demarcation of Centre line and boundary of interchanges

It was agreed that the centre line of alignment of the expressway and boundaries of the land requirements for the interchanges/junctions etc. should be undertaken on the ground, based on the preliminary design.

1.9 Bidding document

It was agreed that preparation of bidding documents for BOOT basis is not included in the Study.

2.0 Financial resource

It was agreed that financial resource to implement the construction and management of the proposed expressways should not be fixed in the Study.

2. STEERING COMMITTEE AND WORKING GROUP

It was agreed that the NCRPB should establish a steering committee under the chairmanship of the Member Secretary of NCRPB, consisting of Chief Planners and Chief Engineers from NCRPB and concerned State Governments, representatives from the M/o U.A.& E., National Highway Authority of India and the secretariat headed by the Chief Regional Planner of NCRPB before the commencement of the Study (See APPENDIX-2 for details). Inception report and Interim Report will be discussed in the Steering Committee and their comments shall be communicated to the JICA Study Team – if any. It was also agreed that a working group consisting of the Planners and Engineers of NCRPB and concerned State Governments should be established before the commencement of the Study (See APPENDIX-3 for details).

3. UNDERTAKING OF GOI (NCRPB)

Undertaking of GOI (NCRPB) stated in the Scope of Work was agreed. Concerning the Clause VII of the Scope of Work, it was further confirmed and agreed that NCRPB should provide the JICA Study Team with the following items:

i) Office space with the size of approximately seventy (70) m^2 or which accommodates approximately fifteen (15) staff.

ii) Two telephones ready to use

iii) Desks and chairs for approximately fifteen (15) staff

iv) One photocopy machine and one fax machine

v) Existing maps and data

vi) Two vehicles with Drivers (A/c)

4. TECHNOLOGY TRANSFER

Concerning undertaking of JICA in the Scope of Work, the technology transfer shall include transfer of technology through counter part personnel training in Japan and through Seminar/Workshop.

01/7/98

APPENDIX-I

ATTENDANTS LIST

INDIAN SIDE

MR. HEMENDER KUMAR	ADDL. SECRETARY, M/O U.A.& E.
DR. NIVEDITA HARAN	DIRECTOR (DD), M/O U.A. & E.
MR. R.C. AGGARWAL	CHIEF REGIONAL PLANNER, NCRPB
DR. N.B. JOHRI	REGIONAL PLANNER, NCRPB
MR. U. DEKA	PROJECT OFFICER, NCRPB
MR. N.K. BHARDWAJ	F&AO, NCRPB

STATE GOVERNMENT OF U.P.

MR. S.C. CHAUHAN	CHIEF ENGINEER, PWD, MEERUT
MR. R.K. TANDON	EXECUTIVE ENGINEER, PWD, GHAZIBAD
MR. S.C. GHILDIAL	CHIEF COORDINATOR PLANNER, NCRPB

STATE GOVERNMENT OF HARYANA

MR. T.C. JAIN	S.E., PWD (B&R), KARNAL
MR. S.R. AGGARWAL	S.E., PWD (B&R), GURGAON
MR. O.P. THAKRAL	SENIOR TOWN PLANNER, GURGAON
MR. A.K. GARG	DTP, SONIPAT
MR. A.K. KASHYAP	ATP, SONIPAT

(LOCAL DEVELOPMENT AUTHORITY)

JAPANESE SIDE (JICA PREPARATORY STUDY TEAM)

Mr. Yusuke KAJIURA	LEADER
Mr. Shiro NAKASONE	MEMBER
Mr. Isao SUGIE	MEMBER
Mr. Akiyoshi TOGIYA	MEMBER
Mr. Yasuhiro OKUBO	MEMBER

OBSERVERS

(JICA INDIA OFFICE)

Mr. Hidekazu KUMANO	RESIDENT REPRESENTATIVE
Mr. Toshiaki TANAKA	DEPUTY RESIDENT REPRESENTATIVE
Mr. Teruyuki INOUE	ASSISTANT RESIDENT REPRESENTATIVE
Mr. R. DINAKAR	PROGRAMME OFFICER

(JICA EXPERT)

Mr. Yasuyuki MATSUI	JICA EXPERT ON EXPRESSWAYS

APPENDIX-2

STEERING COMMITTEE FOR THE FEASIBILITY STUDY FOR THE CONSTRUCTION OF EXPRESSWAYS IN NCR

1.	Member Secretary, NCRPB	Chairman
2.	Director (DD), M/o U.A.& E.	
3.	Chief Engineer (Roads) Min. of Surface Transport	
3.	Engineer-in-Chief, (PWD B&R) Haryana (or his Representative)	
5.	Engineer-in-Chief, (PWD B&R), U.P. (or his Representative)	
6.	Engineer-in-Chief, PWD, Delhi (or his Representative)	
7.	General .Manager., NHAI	
8.	Chief Engineer, PWD, (B&R), Rajasthan	
9.	Vice Chairman, GDA	
10.	Vice Chairman, MDA	
11.	Chief Co-ordinator Planner, NCR Cell, U.P. Sub-Region, Ghaziabad,	
12.	Chief Co-ordinator Planner, NCR Cell, Haryana Sub-Region, Panchkula	
13.	Administrator, HUDA (Incharge Sonipat - Kundli Area)	
14.	JICA Representative	
15.	Chief Regional Planner	Convenor

APPENDIX-3

WORKING GROUP FOR THE FEASIBILITY STUDY FOR THE CONSTRUCTION OF EXPRESSWAYS IN NCR

1.	Chief Regional Planner	Chairman
2.	Chief Engineer (Meerut Division)	
3.	Chief Engineer (Road), PWD, Haryana	
4.	Chief Coordinator Planner, (U.P.)	
5.	Chief Co-ordinator Planner, Haryana	
6.	Senior Research Officer, NCRPB	
7.	Associate Planner, NCRPB	
8.	Research Officer, NCRPB	
9.	Project Officer, NCRPB	
10.	Regional Planner	Convenor

QUESTIONNAIRE (DRAFT)

JAPANESE PREPARATORY STUDY TEAM

FOR

THE FEASIBILITY STUDY

ON

THE CONSTRUCTION OF EXPRESSWAY IN THE NATIONAL CAPITAL REGION (NCR)

IN

INDIA

JUNE, 1998

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

Notes;

- Please mark ○ for the Data / Item in the "Availability" which is available
- Please mark × for the Data / Item in the "Availability" which is not available

I.ORGANIZATIONS CONCERNING THE IMPLEMENTATION OF THE STUDY

ITEM	DESCRIPTION	AVAILABILITY		NAME OF MATERIALS
		AVAIL-ABILITY	PLACE OF DATA AVAILABLE	
1.Organization of the government office		○	NCRPB	
2.NCRPB				
(A) Purpose of establishment		○	NCRPB	
(B) Organization chart		○	NCRPB	
(C) Position of counterpart in NCRPB for Preparatory Study		○	NCRPB	
(D) Position of counterpart in NCRPB for Feasibility Study		○	NCRPB	
(E) Responsible department in case of implementation for construction		○	NCRPB	
(F) Correlation with respective Ministries (MOF, MOC, MOUP etc.)		×		
(G) Correlation with respective States (Uttar Pradesh, Haryana, Rajasthan)		○	NCRPB	
3.Agencies which are responsible for the followings:	(1)For the Expressway			
(A) Road development planning	(2)For the National Highway	○	NCRPB	
(B) Road construction	(3)For the toll roads	○	BOT	
(C) Road maintenance / management	(4)For the State roads	○	BOT → PWD	
(D) Road operation	(5)For the rural roads	○	BOT → PWD	
4.Correlation among various organizations in the road sector	(1)Organization chart illustrating demarcation of function, decision making process, budgeting and supervision			(A) Budgetary support
(A) Ministry of Finance				(B) MOUA&E / NCRPB
(B) MOUA&E and NCRPB				(C) GOI / DGRD,MOST / Chairman NHAI
(C) MOST and NHAI				(D) State Govt. / C.E. PWD
(D) State government & Local Highway Authority				(E) National Govt. / Local Govt.
(E) National Government & Local Government				

5.Agencies in charge of and/or concerned with the followings: (A) Custody of topographic maps and aerial photos (B) Area conservation (C) Geological data / information	(1)Name of Agencies and Departments (2)Name and position of the responsible persons in charge for the Japanese Study Team to contact	○ ○ ○	SOI (Survey of India) SOI GSI (Geological Survey of India)	
6.Organization to supervise and steer the management of the Study	(1)Necessity of the Steering Committee and proposed member organizations	○	NCRPB	

II.TECHNICAL DATA / INFORMATION

ITEM	DESCRIPTION	AVAILABILITY		NAME OF MATERIALS
		AVAIL-ABILITY	PLACE OF DATA AVAILABLE	
1.Design standard & Criteria				
2.Maps to be used for field investigation	(1)Topographic maps covering the Study areas			
	1/ 5,000	×		
	1/ 25,000	△	SOI	Partry available
	1/ 50,000	○	SOI	
	1/250,000	○	SOI	
3.Availability of aerial photos	(1)Aerial photos covering the Study areas with scale and the year photographed	△	SOI	Partry available
4.Geological data in the Study areas	(1)Geological maps covering the Study areas	○	GSI	
	(2)Existing report about data / information such as : -Location of soft ground -Results of geological / soil investigation	○	GSI	
5.Geodetic data in the Study areas	(1)Triangulation point network	○	SOI	
	(2)Bench-mark network	○	SOI	
	(3)Points description (Control point, Bench-mark)	○	SOI	
	(4)Triangulation point data lists	○	SOI	
6.Meteorological data in the Study area	(1)Annual,monthly and daily precipitation data	○	State Meteorological Dept.	
	(2)Temperature	○	State Meteorological Dept.	
7.Hydrological data of rivers in the Study areas		○	Water Resource Dept.	

*Study areas; The areas which the Study shall cover, as defined in the Scope of Work for the Study.
(The proposed expressways are located in the National Capital Region.)

8.Data / information on the related roads in the Study areas	(1)Road maps showing the road classification	○	PWD / NCRPB	
	(2)Road inventories (class, length,surface type, construction history,etc... Preferably computer database)	○	PWD / NCRPB	
	(3)Maps Showing points of traffic congestion, traffic bottlenecks & vehicle speed at study location...	○	PWD / NCRPB	
	(4)Record of past disaster (flood, earthquake, slope failure, etc.)	○	PWD / NCRPB	
9.Transportation network map in NCR and the surrounding area	(1)Network maps and capacity of national transport system (roads, railways, commercial flights and waterways)	○	NCRPB / PCD (Planning Commision Delhi)	
	(2)Traffic flow data and forecasts of freight / passengers by each mode	○	NCRPB / PCD	
	(3)Transportation cost of each mode	○	NCRPB / PCD	
	(4)Development policy	○	NCRPB / PCD	
	(5)National statistics of automobiles (past record & future estimate)	○	NCRPB / PCD	
	(6)Related materials, if any (National transportation study, etc.)	○	NCRPB / PCD	
10.Traffic survey system in the Study areas	(1)Location of periodic traffic count and O-D survey stations	○	PWD	
	(2)Period (e..g. once a year, seasonal, etc.) and Survey Item	○	PWD	
	(3)Vehicle O-D matrix	○	NCRPB	
	(4)Existing zoning map for OD matrix	○	NCRPB	
11.Confirmation of requested route for examination		○		
12.Confirmation of circumstance for examination of 3 route	(1)Start point, End point, Joint point,Interchange point etc..	○		
	(2)Standard for road, bridge and structure etc..	○		
13.Materials of Pre-feasibility Study for Peripheral Expressway		○		

14.Traffic data on the related roads in the Study areas	(1)Traffic volume by vehicle types for the past ten years	○	NCRPB / PWD U.P. & Haryana	
	(2)Breakdown of freight / passengers carried by the roads	×		
	(3)Number of registered vehicles	○	PWD	
	(4)Record of traffic accidents (type, causes, location, etc.)	×		
	(5)Related materials, if any (annual traffic reports, OD matrices report etc.)	○	NCRPB	
	(6)Transportation network maps and capacity of national transport system for road, railways and commercial freights	○	MOST	India Infrastructure Report
15.Land use plans and maps	(1)Present situation and future plan	○	NCRPB	
	(2)Large redevelopment plan	○	NCRPB	
16.Planning standard and Design standard	(1)Expressway capacity manual	○	Indian Road Congress	
	(2)Geometric standard	○	Indian Road Congress	
	(3)Bridge design standard	○	Indian Road Congress	
	(4)Pavement design standard	○	Indian Road Congress	
	(5)Environmental quality standard	○	Indian Road Congress	
	(6)Maintenance manual	○	Indian Road Congress	
17.Reports / information of the road development projects closely related to the Study	(1)Intersection improvement plan	○	NCRPB / PWD	
	(2)Widening plan for major road	○	NCRPB / PWD	
	(3)Bridge plan (new construction & reconstruction)	○	NCRPB / PWD	
18.Road (Expressway and Highway) related budget (past record and prospect)	(1)Road construction budget	○	MOST	
	(2)Road maintenance budget	○	MOST	
	(3)Tax on vehicle by type			
19.Road (Expressway and Highway) related cost	(1)Construction cost by type of road	○	MOST / NHAI	
	(2)Maintenance cost by type of road	○		
	(3)Standard price for traffic survey	○		
20.Foreign assistance concerned to road (Expressway and Highway) Development projects	(1)Country / organization	○	MOST	
	(2)Amount of assistance	○	MOST	
	(3)Outline of the project	○	MOST	
	(4)Related materials (i.e. project reports)	○	MOST	

III.SOCIO-ECONOMIC DATA / INFORMATION

ITEM	DESCRIPTION	AVAILABILITY		NAME OF MATERIALS
		AVAIL-ABILITY	PLACE OF DATA AVAILABLE	
1.Socio-economic indices (Past and future)	(1)GNP and GDP	○	Planning Commission Delhi	
	(2)Population and population growth rate	○	Planning Commission Delhi	
	(3)Industrial, agricultural and mining products (by main sort)	○	Planning Commission Delhi	
	(4)Foreign trade (quantity and value)	○	Planning Commission Delhi	
	(5)Annual budget with breakdown	○	Planning Commission Delhi	
	(6)Public investment by sector	○	Planning Commission Delhi	
	(7)Tourism development plan	○	Planning Commission Delhi	
	(8)Forecast of socio-economic indicators	○	Planning Commission Delhi	
	(9)Others	○	Planning Commission Delhi	
2.Socio-economic indices of the National Capital Region	(1)Population	○	NCRPB	
	(2)Labour force and products in agriculture,mining industry and commerce	○	NCRPB	
	(3)Others	○	NCRPB	
3.Existing development plans and projects in the Study areas	(1)Economic development plans (PIP,etc.)	○	NCRPB / GDA / MDA / KDA	GDA: Ghaziabad
	(2)Transportation / road development plans and projects..	○	NCRPB / GDA / MDA / KDA	Department Authority MDA: Meerut
	(3)Population distribution plan, Land utilization plan Urban development plan, Transportation network plan	○	NCRPB / GDA / MDA / KDA	Department Authority KDA: Kundli
4.Existing urban development plans and reports in the Study areas	(1)Urban planning (zoning maps)	○	NCRPB / GDA / MDA / KDA	Department Authority
	(2)Transportation & road development plans	○	NCRPB / GDA / MDA / KDA	
	(3)Industrial development plans	○	NCRPB / GDA / MDA / KDA	
	(4)Agricultural / mining.development plans	○	NCRPB / GDA / MDA / KDA	
	(5)Tourism development plans	○	NCRPB / GDA / MDA / KDA	
	(6)Housing development plans, etc.	○	NCRPB / GDA / MDA / KDA	
	(7)Present condition and problem the above-mentioned	○	NCRPB / GDA / MDA / KDA	
5.Economic data for economic evaluation	(1)Time evaluation value			
	(2)Running cost for the main transportation	○	CRRI	Road Users Cost Study
	(vehicle operating cost, etc.)	○	CRRI	Road Users Cost Study

IV.ENVIRONMENTAL ISSUES

ITEM	DESCRIPTION	AVAILABILITY		NAME OF MATERIALS
		AVAIL-ABILITY	PLACE OF DATA AVAILABLE	
1.Legislation	(1)Law / guidelines on environmental impact assessment	○	Ministry of Environment and Forests	
	(2)Environmental administration	○	Central Pollution Control Board	
2.International conventions on environmental conservation	(1)Bilateral convention	○		
	(2)Multilateral convention	○		
3.Present situation of the Study areas	(1)Socio-economic environment			
	・Law / guidelines / policy on land acquisition..	○		
	・Number of people to be resettled and plan of resettlement or compensation	×		
	・Main industry or source of income of the residents	×		
	・Number and distribution of school,hospitals, religious facilities	×		
	・Location of the electric wave station	×		
	・Location of the community which might be split by the project	×		
	・Cultural property or archaeological site	×		
	・Use of river / lake water i.e. domestic, industrial and agricultural	×		
	・Existence of common land	×		
	・Land occupancy (rights of residence / land ownership)	×		
	(2)Natural environment			
	・History of natural disaster, landslide earthquake and flood	○	Meteorological Dept.	
	・Vegetation map	○	Agricultural Dept.	
	・Areas affected by soil erosion	×		
	・Change of water level of rivers and lakes in recent years	○	PWD	

	・Location of environmentally vulnerable areas such as wetland	○	PWD	
	・Species of valuable animals and plants living in the Study area	○	PWD	
	・Location of particular areas officially protected such as national parks	○	PWD	
	・Distribution of important landscape or scenery for tourism	○	PWD	
	(3)Quality of life			
	・Present air quality	×		
	・Regulation on emission gas	×		
	・Present water quality	×		
	・Regulation on effluent	×		
	・Present condition of soil contamination	×		
	・Regulation for prevention of soil contamination	×		
	・Present condition of noise and vibration	×		
	・Regulation for prevention of noise and vibration	×		
	・Complaints (pollution of the most concern, etc.)	×		
4.Expropriation	(1)Relevant laws & regulations prescribing expropriation at national and state level	○	Ministry of Law and Justice	
	(2)Any example of disputes between local communities and government (national or state) concerning road construction.	○	Ministry of Law and Justice	

V.OTHER INFORMATION

ITEM	DESCRIPTION	AVAILABILITY		NAME OF MATERIALS
		AVAIL-ABILITY	PLACE OF DATA AVAILABLE	
1.Any specific restrictions related to the Study	(1)Law/regulation or policy to restrict a development of road (Expressway, Highway)	×		
2.Participation of private sector in road construction	(1)Policy on private participation	○	NHAI / NCRPB / MOST	
	(2)Possible scheme for private participation (BOT, BOO, etc)	○	NHAI / NCRPB / MOST	
	(3)Examples of private participation (past, on-going, planned)	○	NHAI / NCRPB / MOST	
3.Availability of the Government's equipment/instruments/ apparatus for the Study	(1)List up equipment/instruments/apparatus which are available for the Study by the following category with the following information; a)Category ・Instruments for the geodetic survey ・Apparatus for geological/soil investigation ・Apparatus for traffic survey ・Computer ・Services vehicle ・Others b)Information ・Name ・Type (or model/maker) ・Characteristics (or capacity) ・Number of units ・Condition	×		

4.Name and ability of local consultant firm or institute	(1)Traffic count survey/analysis and its cost (2)Environmental investigation and its cost (3)Geological survey and its cost (4)Topographical survey and its cost (5)Highway design and its cost	○ ○ ○ ○ ○		

No.	資料の名称	発行年	収集先又は発行機関	備考
1	Regional Plan 2001	1988	National Capital Region Planning Board	
2	The Integrated Mass Rapid Transport System for Delhi	1996-97	Ministry of Urban Affairs and Employment	
3	NCR Planning Board Organisational Setup		National Capital Region Planning Board	
4	Constitution of The NCR Planning Board		National Capital Region Planning Board	
5	Functionl Plan (Transport Sector)		National Capital Region Planning Board	
6	Functionl Plan (Industry)		National Capital Region Planning Board	
7	Feasibility Study for The Expressways in The National Capital Region (Final Report)	1989	National Capital Region Planning Board	
8	The Gazette of India Extraordinary	1985	Ministry of Law and Justice	
9	F-N-G Expressway Project Final Report (Volume 1)	1995	Asian Development Bank	
10	Bidding Documents Including Concession Agreement for Proposed F-N-G Expressway Through Private Financing on BOOT Basis (Volume1 ~ 2)	1998	National Capital Region Planning Board	
11	Roads and Ports Investment Opportunities	1997	Ministry of Surface Transport	
12	Pre-Feasibility Study of Delhi Peripheral Expressway and Geotechnical Services Interim Report	1997	National Capital Territory of Delhi	
13	National Capital Region Growth and Development	1996	National Capital Region Planning Board	
14	Transport Section Plan and Investment Strategy 2011		National Capital Region Planning Board	
15	Proposed F-N-G Expressway Final Report (Volume 3)	1995	Asian Development Bank	
16	Drawing for Typical Interchanges		National Capital Region Planning Board	
17	Integrated Multi Modan Mass Rapid Transit System for Delhi		Ministry of Urban Affairs and Employment	
18	Delhi's Emerging Scenario		National Capital Region Planning Board	
19	Delhi Guide Map (S=1/25,000)	1985	Survey of India	
20	Political Map of India (S=1/4,000,000)	1997	Survey of India	
21	Physical Map of India (S=1/4,500,000)	1979	Survey of India	
22	Tourist Map Series Delhi (S=1/50,000)	1990	Survey of India	
23	Delhi Guide Map (S=1/25,000)	1985	Survey of India	
24	Topographical Map (S=1/50,000) Sheet No.53H/1, 53H/2, 53H/5, 53H/6, 53H/9, 53H/10	1977	Survey of India	

No.	資料の名称	発行年	収集先又は発行機関	備考
25	Topographical Map (S=1/250,000) Sheet No.53H	1980	Survey of India	
26	Topographical Map (S=1/25,000) Sheet No.53H/5/SW, 53H/6/NE, 53H/6/NW	1994	Survey of India	
27	Proposed Express Highway Ghaziabad to Kundoli (S=1/50,000)			
28	Capability Statement		Consulting Engineering Services (India) Limited	
29	The Firm-Background and Experience		Lea Associates	
30	Company Profile		Intercontinental Consultants and Technocrats Pvt.Ltd.	
31	CES Traffic and Transportation		Consulting Engineering Services (India) Ltd.	
32	Organisational Setup		National Capital Region Planning Board	
33	Ghaziabad Master Plan 2001		National Capital Region Planning Board	
34	Land Use 1986 ~ 2001	1988	National Capital Region Planning Board	
35	Proposed Land Use 2001	1988	National Capital Region Planning Board	
36	Settlement Pattern 1981 ~ 2001	1988	National Capital Region Planning Board	
37	Transport Network 2001	1988	National Capital Region Planning Board	
38	Development of Long Term Plan for Expressways in India	1991	Ministry of Surface Transport	
39	Pre-Feasibility Study of Delhi Peripheral Expressway Draft Final Report	1997	National Capital Territory of Delhi	
40	Delhi Schedule of Rates	1997	Central Public Works Department	
41	List of The Union Cabinet	1998	Center of Publications	
42	Directory of Center Government Officials	1998	Center of Publications	
43	Company Profile		STUP Consultants Limited	
44	Range of Services and Experience		RITES Consultants & Engineers	
45	Ghaziabad Master Plan 2001 (Drawing Map)		PWD, Uttar Pradesh	
46	Modinagar Master Plan 2001 (Drawing Map)		PWD, Uttar Pradesh	
47	Meerut Master Plan 2001 (Drawing Map)		PWD, Uttar Pradesh	
48	Sonipat - Kundli Land Use Plan 2021 (Drawing Map)	1996	PWD, Haryana	
49	Planning Atlas National Capital Region	1998	National Capital Region Planning Board	
50	Guidelines for Environmental Impact Assessment of Highway Project	1998	The India Roads Congress