



Highways & Transportation Engineering Sector

“Advances in transportation, communication and entertainment have transformed and unified the world.”

Carl Sagan

The road network is to a country what arteries are to the human body. The road and highway network serves as a pivotal communication link for people to move from one place to another for the purpose of work, business, agriculture, tourism and recreation, thus boosting the national economy. Improvement in transport infrastructure creates new opportunities by linking domestic and international markets and reducing travel time and cost. Better roads also play a significant role in bringing about prosperity to populace.

With the sharp increase in population, rapid urbanisation and industrial growth, the road transport has assumed greater importance in the modern-day world. NESPAK has its share of contribution to the development and progress of Pakistan in the form of its unmatched consultancy services in the Highways and Transportation Engineering Sector.

At NESPAK, a vast range of services is being offered in the domains of highways and transportation, airports and seaports and harbours. NESPAK has been rendering high quality consultancy services for motorways, highways, flyovers, bridges, interchanges, roundabouts, underpasses, tunnels, farm-to-market and other paved roads. NESPAK has been contributing to the national development in different ways by offering its state-of-the-art services in the Highways and Transportation Engineering Sector.

During the last five years, the Pakistan Government has laid special emphasis on the China-Pakistan Economic Corridor (CPEC) under the One Belt One Road Initiative, which holds international importance. It will not only facilitate China for its access to sea, but will also boost Pakistan's trade potential by opening new industrial zones along the corridor. NESPAK is playing a key role by providing engineering consultancy services like design

and construction supervision for various portions of the western corridor of the CPEC. Out of total CPEC western corridor (2,458km), we are providing consultancy services for around 1,995km length. So far, NESPAK has been involved in 14 highway projects related the CPEC.

Another feather has been added to NESPAK cap's in the form of the maiden Lahore Orange Line Metro Train Service System in Pakistan for which the Company provided planning, detailed design and construction supervision services.

After the super-flood-2010 in Pakistan, NESPAK was also entrusted with the task of rendering consultancy services for the reconstruction and rehabilitation of roads damaged by the flood. In this way, the Company got another opportunity to serve the motherland.

Established in 1974 as Highway Section, it has come a long way by maintaining NESPAK's position as the market leader in the highway engineering consultancy sector. The Highway Section was later redesignated as the Highways and Transportation Engineering Division. NESPAK has kept pace with the changing trends in the field of engineering consultancy, updating its services and expertise. The Company has contributed a lot to various projects in the international and domestic markets by offering qualitative, practicable and modern solutions to its clients.

NESPAK has played a major role in the modernisation of communication sector in Pakistan and abroad, particularly in the Middle East. NESPAK stepped into the international market by acquiring highway projects in the United Arab Emirates (UAE). After that, it worked in the Sultanate of Oman and then there was no looking back. To date, it has worked in Nigeria, Bangladesh, Benin, Qatar, Afghanistan and Saudi Arabia.

Highways

The Highways and Transportation Engineering Division is a specialty group within NESPAK which offers a wide array of engineering services in the fields of motorways, highways, urban and rural roads, grade-separated interchanges, bridges and flyovers, underpasses and tunnels, pavement and transportation engineering including traffic modelling and forecasting, feasibilities, economic and financial analysis. NESPAK has pooled Pakistan's best skills and expertise. It has one of the largest groups of expert highway engineers in the design of roads and bridges as well as management and construction supervision of road projects. NESPAK has more than 917 employees on its strength including highly qualified, trained and experienced engineers in the fields of highways, transportation engineering, survey, soil and materials, geometric design, pavement design, structural design, contracts, specifications, tender documentation and construction supervision.

The Company has undertaken a total of 765 projects including those relating to the highways, airports and seaports and harbours in Pakistan and abroad. Out of these, 82 projects are in progress. The cumulative cost of these 765 projects is Rs. 4,324 billion.

Following is an overview of NESPAK's scope of services and expertise in the field of highways and transportation engineering:

SCOPE OF SERVICES

Road Infrastructure Master Planning:

Planning road networks, their inter-connectivity, probable use and relative importance. Priority ranking of roads in a road network based on socio-economic factors.

Pre-feasibility Studies for Route Selection:

Identification of potential corridors, study and selection of the most suitable/viable route for adoption of the final alignment on the basis of technical merits/demerits, cost-effectiveness and durability in terms of maintenance requirements, impact of terrain ranging from the snow-capped mountains to the areas of moving sand dunes.

Feasibility Studies: Economic studies for assessment of benefits of highway projects as compared to the total investment. Benefit cost ratio (B/C ratio), determining the Economic Internal Rate of Return, traffic surveys, analysis and traffic projections over the design life of the project. Feasibility studies of projects on Build-Operate-Transfer basis where self-financing by the private sector is involved.

Transportation and Traffic Engineering:

Transportation system surveys, analysis, forecasting, design, traffic flow control, regulation and administration.

Soils and Materials Investigation:

Evaluation of the suitability of soils and materials for highway construction, determining the permeability, shear strength, consolidation, grain size, dry density, liquid and plastic limits, field tests including California Bearing Ratio test, plate test and nuclear field equipment tests.



Testing is also done on aggregates, sand, cement, water, steel and bitumen to ascertain their suitability for highway construction.

Geometric Design for Road Works and

Interchanges: Design for carriageway pavement widths, horizontal and vertical alignments, slopes, interchanges, flyovers, acceleration/deceleration lanes, intersections, traffic islands, channelisation and other features.

Pavement Design: Design of pavements to determine thickness of road layers using standard empirical methods such as the latest AASHTO Guide and British Road Note No. 31 based on the traffic demand and projections. The design is also checked against the “mechanistic” approach method.

Construction Supervision of Roads/

Bridges/Tunnels: Supervision of construction activities to ensure the quality conforming to the contract specifications, progress monitoring and coordination between the Client and the Contractor or any other agency involved to ensure timely and successful completion of work.

EXPERIENCE

NESPAK has to date worked on 644 highway and traffic engineering projects costing Rs. 3,898 billion. The depth of experience acquired is summarised below:

Motorways and Highways: Design and construction supervision of about 50,000 kilometers of highways and motorways in Pakistan, Afghanistan, Nigeria, Qatar, Saudi Arabia, Oman and the UAE. The first project was the design of the 1,220 km long Indus Super Highway along the right bank of the Indus River, stretching from Peshawar to Karachi.

Urban Roads: Design and construction supervision of a number of urban roads in all major cities of Pakistan and in Liwa, Shinas, Sohar, Ghubra South and several other areas in Oman. The approximate length of these roads is 5,000 km.

Rural/Secondary Roads: Consultancy services for 10,000 km long rural/secondary roads including farm-to-market roads within Pakistan and abroad.

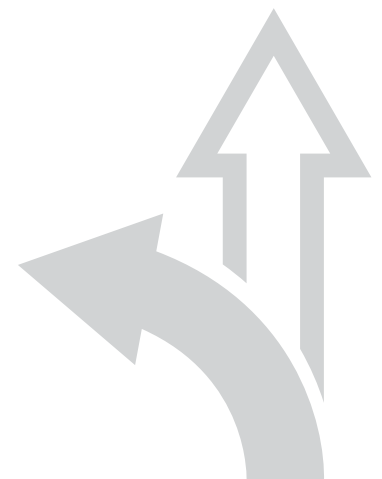
Grade-separated Interchanges: Consultancy services on several grade-separated interchanges including 16 interchanges under major CPEC Projects, Faizabad Interchange in Islamabad, 18 interchanges on the Lahore Ring Road and Al-Khaboura Interchange in Oman.
Bridges and Flyovers: Design and construction supervision of more than 200 bridges and 50 flyovers in Pakistan and abroad.

Underpasses: Design and construction supervision of 14 underpasses parallel to the canal and two underpasses across the canal in Lahore. Design and construction supervision of an underpass at the Committee Chowk on Murree Road in Rawalpindi, an underpass in Multan and the KPT Underpass in Karachi. Design of 9 grade-separated facilities on 8 major intersections of Lahore.

Mass Transit System: Consultancy services for the Lahore Orange Line Metro Train, Metro Bus System Lahore and Metro Bus System Rawalpindi-Islamabad.

Tunnels: Consultancy services on Kohat Tunnel and Lowari Tunnel projects in the Khyber Pakhtunkhwa Province in Pakistan.

CPEC Projects: Engineering consultancy services for 14 road projects. Services are being offered for a total of 311 interchanges, flyovers, bridges and underpasses under three major motorway projects.





NESPAC in a joint venture with a Chinese concern was engaged by the Punjab Government to provide design and construction supervision services for the Lahore Orange Line Metro Train System. It is the first-of-its-kind project in the history of Pakistan. Awarded by the Punjab Masstransit Authority, the Rs. 163 billion project was divided into three packages and is fast heading for completion. The project covers a 27km route having 26 stations starting from Ali Town, Raiwind Road and culminating at Dera Gujran, G.T. Road. The Anarkali and Central stations are planned to be underground, while the remaining 24 are elevated. The rail line is planned to run through the centre of each station, with platforms flanking the track.



NESPAK, as a consortium leader, is involved in the project planning, design and tender documentation for the Karachi Circular Railway Project which is an integral component of the Mass Rapid Transit System for the Karachi City. Awarded by the Sindh Government, the Rs. 210 billion project has been prioritised for implementation under the CPEC plan.



Surab-Basima-Nag-Panjgur-Hoshab Road — CPEC

NESPAK has carried out design review and construction supervision of Surab-Basima-Nag-Panjgur-Hoshab Road Project. The scope of this Rs. 34 billion project was to upgrade the highway from Surab to Hoshab which connects the highway near Surab/Quetta. This route connects the Gwadar Port with Afghanistan and the Central Asian States and is part of western alignment of the CPEC. NESPAK provided consultancy services for this 459km project amid great security risks, ensuring high quality construction as per National Highway Authority (NHA) standards within tight timelines.

Hakla-Dera Ismail Khan Motorway — CPEC



NESPAK has conducted feasibility study and detailed design for the western corridor of the CPEC from Hakla on M-I to Dera Ismail Khan. Awarded by the NHA, this Rs. 125 billion project has entered the construction phase under the supervision of NESPAK. The 285km four-lane project lies mainly in the Punjab and partly in the Khyber Pakhtunkhwa. In the continuation of the Hakla-Dera Ismail Khan Project, the NHA approached NESPAK for the detailed design of the dualisation of Dera Ismail Khan-Zhob Road including the Zhob Bypass. The Rs. 66 billion project comprises a four-lane highway from Yarak to Zhob via the Sagu, Daraban, Mughal Kot and Manikhwa areas.



Pakistan Metro Bus Project for Rawalpindi-Islamabad

Karakorum Highway Improvement/Upgradation

NESPAK undertook design review and monitoring of construction for the “Improvement/Upgradation of Karakorum Highway” from Raikot to Khunjerab near the Pakistan-China border in 2014. The 335km road project costing Rs. 45 billion was awarded by the NHA and sponsored by the Export-Import Bank of China.



The 22 km long Pakistan Metro Bus Project for Rawalpindi-Islamabad was completed under NESPAK supervision and inaugurated in 2015. The project comprised the construction of a 10m wide dedicated signal-free corridor for safe operation of the Metro Bus between Islamabad and Rawalpindi. There are 24 bus stations, 10 in Rawalpindi and 14 in Islamabad, each with a 5m wide median platform. The stations accommodate three bus bays in one direction to facilitate simultaneous docking of three articulated buses.



Lahore Ring Road Project

NESPAK undertook the Lahore Ring Road Project right from the feasibility and alignment selection (by traffic modelling) to detailed design, PC-I preparation, tender documentation and construction supervision stages. The Lahore Ring Road Project has been carried out in two phases. The Phase-I consisting of the 40km Northern Loop was constructed under 17 packages at a total cost of Rs. 74 billion. The whole Northern Loop starting from Babu Sabu Interchange up to Package-17 (near the Sui Gas Housing Society) through the Niazi Interchange, Mehmood Booti, G.T. Road Interchange, Harbanspura Interchange, Abdullah Gul Interchange, Airport, DHA Bhatta Chowk and Nawaz Sharif Interchange is being used by vehicular traffic. The Phase-II comprising the 49km Southern Loop has been divided into four construction sections. Work on the Rs. 72 billion Southern Loop has been started on the Build-Operate-Transfer (BOT) system.



Metro Bus Service System, Lahore

NESPAK achieved a milestone by providing consultancy services for Pakistan's first-ever Metro Bus System at the Ferozepur Road, Lahore. The Company provided design, tender documentation and construction supervision services for the country's fastest bus rapid transit system project, comprising a 27km dedicated bus-way corridor with the state-of-the-art facilities. The Rs. 30 billion project awarded by the Lahore Development Authority was completed in a record time.





Pindi Bhattian-Faisalabad Motorway Project



NESPAK prepared feasibility study report, detailed design and tender documents and supervised construction of Rs. 6 billion Pindi Bhattian-Faisalabad Motorway (M-3) Project. The 54 km long four-lane motorway has been constructed to link the Pindi Bhattian Junction on the Lahore-Islamabad Motorway (M-2) with Faisalabad.

Islamabad-Murree Dual Carriageway

NESPAK designed and supervised this Rs. 13 billion expressway project in 2012. The 43km project road located in the rolling and mountainous terrain starts from Satra Mile and ends at Lower Topa. This road project beyond Satra Mile runs totally in virgin valley – the other side of the ridge of the existing Murree Road and passes through the rugged terrain along steep mountains and treacherous areas.





Yellow Line Bus Rapid Transit System, Karachi

The proposed Bus Rapid Transit (BRT) Yellow Line is part of the integrated Mass Transit Master Plan which will interface with other proposed BRT lines at Singer Chowrangi (Brown Line), Kalapul (Karachi Circular Railway), Numaish (Green and Blue Line), and People's Roundabout (Red Line).

A NESPAK joint venture won this project in a competition in 2013. The Yellow Line BRTS Karachi route stretches over 26 kilometres between Dawood Chowrangi and Numaish Chowrangi and Regal Chowk via 8000 Road, Korangi Road and FTC Building. The Rs. 14 billion project will be completed under the Public-Private Partnership Mode.

Quick Impact Projects



NESPAK rendered design and construction supervision services for the fast-track Quick Impact Projects in the Federally Administered Tribal Areas. Six major roads measuring 477 kilometres in the South Waziristan Agency, North Waziristan Agency, Khyber Pakhtunkhwa and Khyber Agency were constructed under this Rs. 34 billion project. The widening and improvement of Tank-Jandola-Makin Road, Kaur-Gomal-Tanai-Wana Road, Wana-Shakai-Makin Road, Bannu-Miranshah-Ghulam Khan Road, Dera Ismail Khan-Tank Road and Peshawar-Torkham Road were carried out under the QIPs. The project was awarded by the Frontier Works Organization (FWO) and funded by the United States Agency for International Development.



Emergency Rural Road Rehabilitation Project, KPK

NESPAK carried out feasibility study, detailed design and construction supervision of the Khyber Pakhtunkhwa Emergency Rural Road Rehabilitation Project. The Rs.15 billion project comprised 80 roads and 10 bridges in 17 districts with a total length of 527 kms. The project was executed by the KPK Communication and Works Department and funded by the Japan International Cooperation Agency.



Karachi-Hyderabad Motorway (M-9)

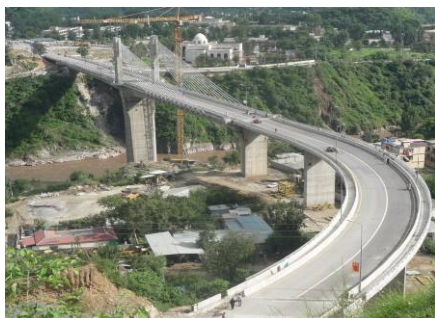


NESPAK is rendering design review and quality control services for the 136km Karachi-Hyderabad Motorway (M-9) costing Rs. 38 billion. The project comprises the conversion of the four-lane Karachi-Hyderabad Superhighway into a six-lane fenced motorway on the BOT basis. The concessionaire, the FWO, is responsible for constructing and operating the motorway for a period of 25 years.



West Bank Bypass, Muzaffarabad

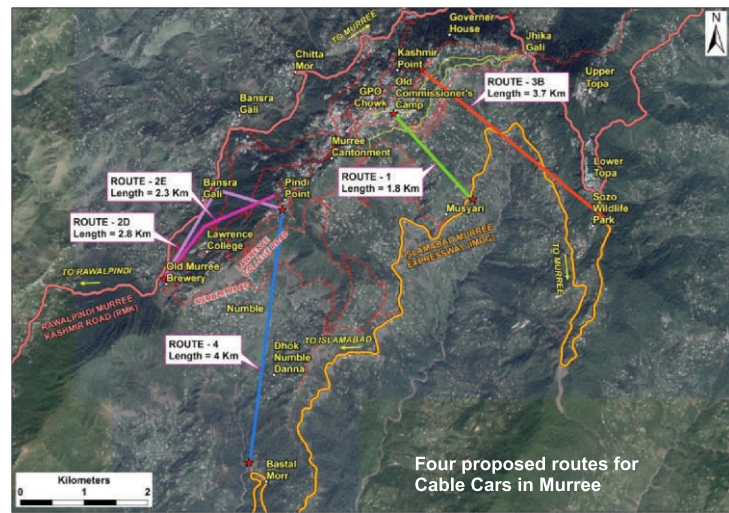
The Earthquake Memorial Bridge being the main feature of the West Bank Bypass Project was completed under the supervision of NESPAK at a cost of Rs. 2 billion in 2014 at Muzaffarabad, Azad Jammu and Kashmir. This is a 473m long signature bridge identified as Balanced Cantilever Box Girder Cable Stay Extrados Bridge which is the first of its kind in Pakistan.



Aziz Cross Interchange, Gujranwala



NESPAK provided detailed design and construction supervision for a signal-free interchange at Aziz Cross, Gujranwala. The project comprised construction of a main flyover having three lanes on either side for traffic coming from Rawalpindi and Lahore entering or exiting Gujranwala. Another component of the project is a double elevated ramp which leads traffic coming from eastern side of the G.T. Road. The project having a cost of Rs. 6 billion also includes a two-lane bridge over the railway line.



Four proposed routes for Cable Cars in Murree



Chaubucha Underpass, Lahore

NESPAK provided consultancy services for the Chaubucha Underpass, Lahore awarded by the Lahore Development Authority. This Rs. 4 billion signal-free Canal Road Project included the construction of an underpass at Chaubucha and widening of Canal Road in three packages. Two underpasses have been constructed under the Railway Track on either side of the canal having three lanes and a clear height of 5.10 metre at

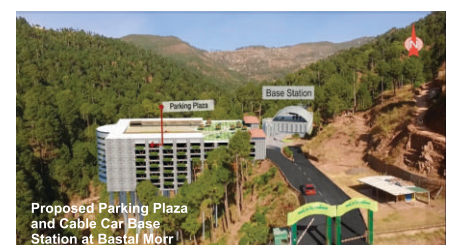
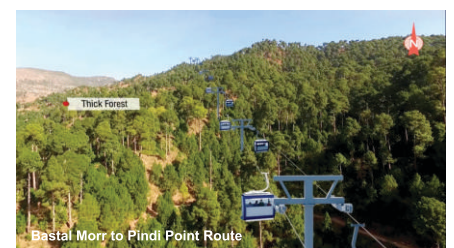
Chaubucha and Griffen Railway Level Crossing. This is the longest underpass of Pakistan having a length of 1.30km.



Installation of Cable Cars in Murree

A NESPAK-led joint venture comprising consultancy firms from Switzerland and Australia provided services to the Tourism Development Corporation Punjab for carrying out feasibility studies for the installation of Cable Cars along with parking plazas and allied facilities at various locations in Murree.

The feasibility studies for four routes i.e., Musyari-Old Commissioner's Camp, Murree Brewery-Pindi Point, Lower Topa-Kashmir Point and Bastal Morr-Pindi Point were undertaken under the project. The studies included traffic studies, geological and geotechnical assessment, landslide studies, drainage studies, environmental studies, ropeway analysis and concept design of the cable car system. The plan also comprised preliminary front end engineering design of the parking plaza, base station/landing station buildings and access roads.





Kohat Tunnel Project

NESPAK in a joint venture provided consultancy services covering detailed design and construction supervision for the 2 km long Kohat Tunnel and Access Road Project in 2003. The Rs. 5 billion project was financed by the Japan Bank for International Cooperation.

Kalma Chowk Flyover, Lahore

NESPAK undertook detailed design, tender documentation and construction supervision of this fast-track project and completed the entire project in a record time of 135 days. This Rs. 2 billion project entailed the construction of two 572m flyover carriageways (three lanes each) at the Kalma Chowk, Lahore, having 10m space between them for the Metro Bus Service System.



Dualisation of Ibri-Dariz-Miskin Road, Oman

NESPAK has carried out detailed design, tender documentation and construction supervision for Dualisation of Ibri-Dariz-Miskin Road, Oman. This 34km main road connects Miskin, Maqnat, Hadramaut and Dariz areas with the Ibri City, the headquarters of Governorate of Al-Dhahira Region in Wilayat Ibri. The project costing US\$ 169 million was assigned by the Ministry of Transport and Communications, Sultanate of Oman.

Karachi Port Trust Flyover Project

NESPAK rendered detailed design, tender documentation and construction supervision services for the Karachi Port Trust Flyover on Korangi Road, Karachi. The project costing Rs. 600 million was completed in 2008.





Wadi Shafan Road, Oman

The Wadi Shafan Road Project comprises an asphalt road situated in Wilayat Al-Khaboura with a small segment traversing through Wilayat Saham in the Batinah Region. The road starts from Village Biayaiq and traverses along the bank of Wadi Shafan. It crosses the wadi at various locations and ends in Village Aqir Al-Abriyyin. The road provides access to different villages on its way. NESPAK is rendering design, tender documentation and construction supervision for this 26km project costing US\$ 75 million.

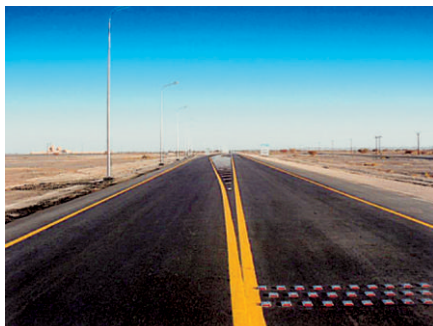
Nizwa–Thumrait Road, Oman

NESPAK supervised the construction of Rehabilitation Works for Nizwa–Thumrait Road Stage-IV costing US\$ 71 million in 2016. The project road is part of major highway linking Muscat and Salalah, two major cities of Oman. The rehabilitation work comprised reconstruction of two-lane asphalt road, widening of shoulders and allied facilities. The 134km project was awarded by the Ministry of Transport and Communications.

Wilayat Madha Road, Oman



The project consists of two-lane asphalt road situated in Wilayat Madha, Governorate of Musandam. NESPAK is supervising the construction of this 11km project awarded by the Directorate General of Roads, Ministry of Transport and Communications, Sultanate of Oman. The scope of work consists of earthwork and filling, drainage structures, necessary protection work to road embankment and access junctions for future roads expansion for this US\$ 40 million project.



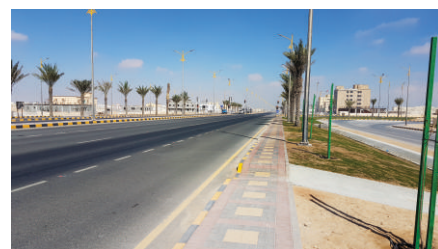
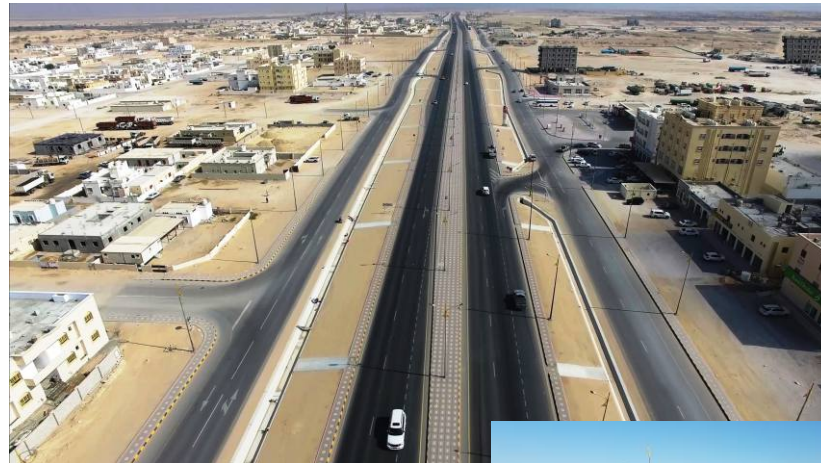
Al-Batinah Coastal Road (Section-I), Oman

NESPAK has carried out detailed design and construction supervision services for all-weather four-lane Batinah Coastal Road Project. The dual carriageway comprises service roads, link roads, wadi bridges/flyover and box/pipe culverts. The mega project was conceived in an entirely new alignment, mostly along the Batinah Coast to provide interconnectivity to various wilayats, boost tourism/fishing industry and relieve traffic load on the main Batinah Highway. The US\$ 247 million venture was awarded by the Ministry of Transport and Communications, Sultanate of Oman.



Duqm Centre Main Road Improvement Project, Oman

NESPAK is involved in the design, tender documentation and construction supervision for the Main Road Improvement at Duqm Centre in the Governorate of Duqm, Al-Wusta Region, Sultanate of Oman. The project entails the construction of a 7km dual carriageway, 11km service roads, 12 roundabouts, four Intersections, three box culverts, two Irish crossings and parking areas. The US\$ 34 million project was awarded by the Special Economic Zone Authority, Duqm.



Dhaka-Chittagong Highway Project, Bangladesh

The Dhaka-Chittagong National Highway, the most important highway of Bangladesh, is considered to be the lifeline of commerce and carries port traffic to Dhaka and other parts of the country. The improvement of this strategic corridor was envisaged to provide economic and social benefits to the country's Southeastern Region. The project involved the construction of a second carriageway from Daudkandi to Chittagong. The total road length is 196 kms with two major bridges across Meghna River (930m) and Meghna-Gumti River (1200m). NESPAK scope of services included detailed design and tender documentation for this US\$ 284 million project.





Roads in Madinah Munawwarah, Saudi Arabia

NESPAK completed the construction supervision services for the “Road Projects in Madinah, Hail, Jazan and Al-Baha Areas” in 2010. The project with a cumulative cost of US\$ 184 million was awarded by the Kingdom of Saudi Arabia's Ministry of Transport.

Kabul-Torkham-Jalalabad Road, Afghanistan

The rehabilitation/improvement of the 222 km long Kabul-Torkham-Jalalabad Road was entrusted to NESPAK first in 1999 for rendering design services. Later in 2003 and 2007, NESPAK was engaged for providing design services for the 7metres wide existing carriageway and construction supervision for the Torkham-Jalalabad Road. The design of the additional carriageway was prepared with the same specifications as used for the rehabilitation of the Torkham-Jalalabad Road. The project road starts from the Liberty Intersection in the outskirts of Kabul and ends at the Pakistani border town of Torkham, passing through Jalalabad and Sarobi, the two major cities of Afghanistan. The second carriageway of the Torkham-Jalalabad Road was constructed by the Government of Pakistan as a goodwill gesture being part of the Reconstruction of



Afghanistan Programme. This US\$ 142 million project was completed in a record period of 15 months. The Government of Afghanistan awarded a gold medal to the NESPAK Managing Director for the timely completion of the project.

Airports

“All human life can be found in an airport.”

David Walliams

NESPAK has the distinction of being the only consulting firm in Pakistan to have successfully undertaken several international airport projects in Pakistan and abroad. The Company has developed expertise to plan and design terminal buildings, runway systems, airfield lighting, telecommunication systems and all other vital components and infrastructure facilities required for the operation of a modern airport. NESPAK has created a specialty division for the Airport Sector, comprising highly qualified and experienced planners, architects and engineers. The designers at NESPAK lay great emphasis on functionality and state-of-the-art systems to provide high level of services for airport owners and end users.

SCOPE OF SERVICES

Feasibility Studies: Economic and technical feasibility studies, traffic forecasts, evaluation of alternatives, e.t.c.

Surveys and Investigations: Topographic surveys and geological and geotechnical investigations.

Master Planning, Design and Tender Documents: Master Planning, design and tender documentation of passenger and cargo terminal buildings, equipment, runways, taxiways and other related facilities.

Technical and Financial Evaluation: Technical and financial evaluation of airport projects including Build-Operate-Transfer (BOT)/Build-Own-Operate (BOO) projects. Construction Management and Supervision: Construction management and supervision including procurement and contract management, documentation and records,

quality assurance, safety and security, inspection/testing, commissioning and training.

EXPERIENCE

NESPAK's track-record includes master planning and design of the Passenger Terminal Complex at the Jinnah International Airport, Karachi, which was carried out in association with a foreign consultant. Later, field design support services were solely provided by NESPAK. Design and construction management of the Secondary Runway at the Jinnah International Airport, Karachi and the New Terminal Complex of Allama Iqbal International Airport, Lahore were also carried out independently by NESPAK. The firm undertook the design of airside and landside infrastructure of the New Islamabad International Airport Project in association with a foreign consultant. NESPAK is providing consultancy services for New Gwadar International Airport Project for which NESPAK also undertook design and tender documents. NESPAK has provided design and construction supervision services for the Sialkot International Airport, the first private sector airport in Pakistan. Design of a new hangar at the Allama Iqbal International Airport for VIP aircraft was also prepared. The experience gained by the Company in Pakistan also helped in acquiring projects overseas including design of a wide-bodied aircraft hangar at the Baku International Airport, Republic of Azerbaijan, Facilities Building at the Seeb International Airport, Oman, Upgradation of Najran Airport, Saudi Arabia, Master Planning and Design of the New Madain Saleh Airport at Al-Ula, Saudi Arabia and specialist input for the Area Control Centres at Jeddah and Riyadh International Airports. NESPAK is currently providing services for the expansion and renovation of Terminal Building at the Bacha Khan International Airport, Peshawar as well as design services for upgradation and expansion of Muzaffarabad Airport and Dera Ismail Khan Airport in Pakistan.

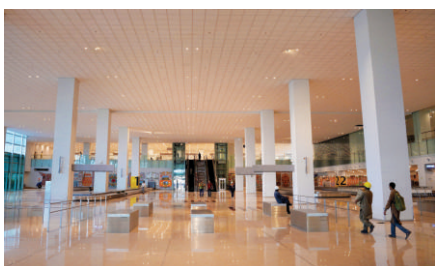
Airport Terminal Buildings: Planning and design of terminal buildings for four major airports in Pakistan, including construction supervision. The terminal buildings are equipped with passenger boarding bridges, modern baggage handling and other electronic systems.

Hangars: Techno-economic studies and detailed design for a wide-bodied aircraft hangar at the Baku International Airport to perform A, B, C and D checks on the aircraft up to the size of Boeing 747-400.

Runways and Taxiways: Design of runways, taxiways and aprons for three major international airports and four smaller airports including construction supervision of three new runways as well as design of Airfield Lighting Systems, apron flood lighting and navigational aids.

Air Traffic Control Towers: Planning and design of two air traffic control towers for major airports of the country.





New Islamabad International Airport

The Pakistan Civil Aviation Authority (CAA) engaged NESPAK, in a joint venture with a foreign firm, for providing consultancy services for the New Islamabad International Airport (NIIA) Project spread over a 3,200-acre site located 30 kms south-west of the existing airport.

The new airport has been designed to handle 10 million passengers in the initial stage of operations. The airport will have 3,650m long main runway and will be the first airport in Pakistan equipped to handle Airbus A380 aircraft plus a secondary runway for handling other aircraft operations. The NIIA can simultaneously accommodate over 30 aircraft at the aprons serving its passenger and cargo terminals.

The Rs. 80 billion airport is equipped with the latest CAT-III Airfield Lighting System and other modern navigational aids. Provision of all modern facilities and systems will enable NIIA to emerge as a regional hub of aviation.

NESPAK's services included detailed design, tender documents and field design support services of all airport airside and landside infrastructure facilities including runway system, road network and departure level bridge, ATC Complex, fire crash rescue buildings, air security complex and various other buildings. NESPAK has also provided construction supervision services for various facilities at the airport.

New Gwadar International Airport



NESPAK, in a joint venture with a foreign firm, has carried out the master plan, design and tender documentation for the New Gwadar International Airport (NGIA) Project including Passenger Terminal Building, ATC Tower, runway system, CAT-I airfield lighting and other infrastructure. The construction of the site protection works including fencing, perimeter track and watch towers around the 4,300-acre site, located 26 kms east of Gwadar Town, was completed in 2014 under NESPAK's supervision. The NGIA will be equipped with all modern facilities to handle all types of wide-bodied aircraft currently in operation. Awarded by the CAA, the construction of NGIA Project will be implemented under the China-Pakistan Economic Corridor (CPEC) Programme through a Rs. 22 billion grant by the Chinese Government.



Jinnah International Airport, Karachi

NESPAK, in association with a German and US firm, rendered consultancy services for project planning, detailed design and construction supervision for Pakistan's largest airport facility, the Jinnah International Airport, Karachi.

The project costing Rs. 5 billion became operational in 1992. The airport terminal covers an area of 115,000 sqm and is equipped with modern passenger and cargo facilities to handle more than 8 million passengers annually. The construction of this project paved way for modernising airport infrastructure in Pakistan.



Allama Iqbal International Airport, Lahore

The Allama Iqbal International Airport, the second largest airport in the country, is located about 15 kms from the centre of the Lahore City. NESPAK designed and supervised the construction of the Rs. 10 billion new passenger terminal of the Allama Iqbal International Airport and its ancillary works in 2003. The terminal covering an area of 71,000 sqm houses seven aircraft gates with passenger boarding bridges at each gate. Associated airside facilities such as full length parallel taxiway, apron, etc., were also designed by NESPAK. The terminal caters for 7 million international and domestic passengers annually. NESPAK's consultancy services also included project planning and tender documentation for this project of immense national importance.



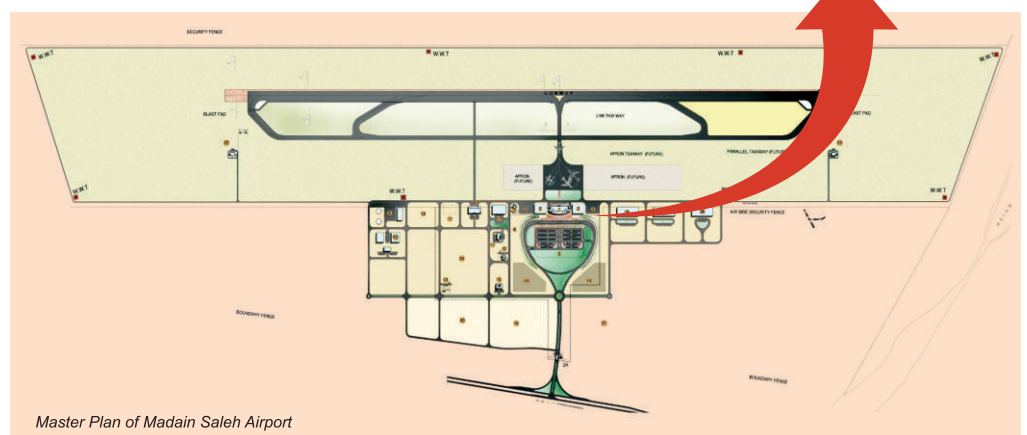
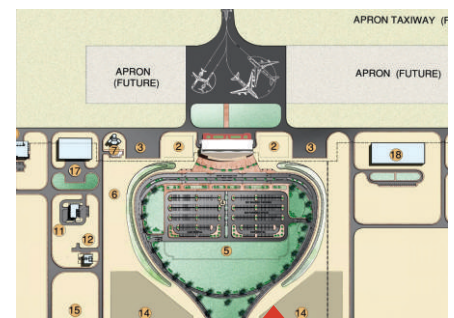


Bacha Khan International Airport, Peshawar

The Bacha Khan International Airport, Peshawar is the fourth busiest airport in Pakistan and handles domestic and international traffic. The Pakistan Civil Aviation Authority appointed NESPAK for design and construction supervision services for the Terminal Building extension and renovation works. The project comprises the construction of new extension and renovation of the existing terminal along with related infrastructure development, ASF camp and a multi-level car parking facility. The renovated terminal will feature two passenger boarding bridges. NESPAK has completed detailed design and is involved in construction supervision services for this Rs.5 billion project.

Madain Saleh Airport Project

NESPAK prepared master plan and concept design of airside infrastructure for the Madain Saleh Airport Project awarded by the General Administration of Civil Aviation, Kingdom of Saudi Arabia in 2005. The new airport is capable of handling Boeing 747-400 aircraft and will serve the touristic region of Madain Saleh–Al-Ula in the northwest part of the Kingdom.



Master Plan of Madain Saleh Airport

3. Seaports and Harbours

“Everything in a modern (container) port is enormous, overwhelming, crushing.”

Rose George

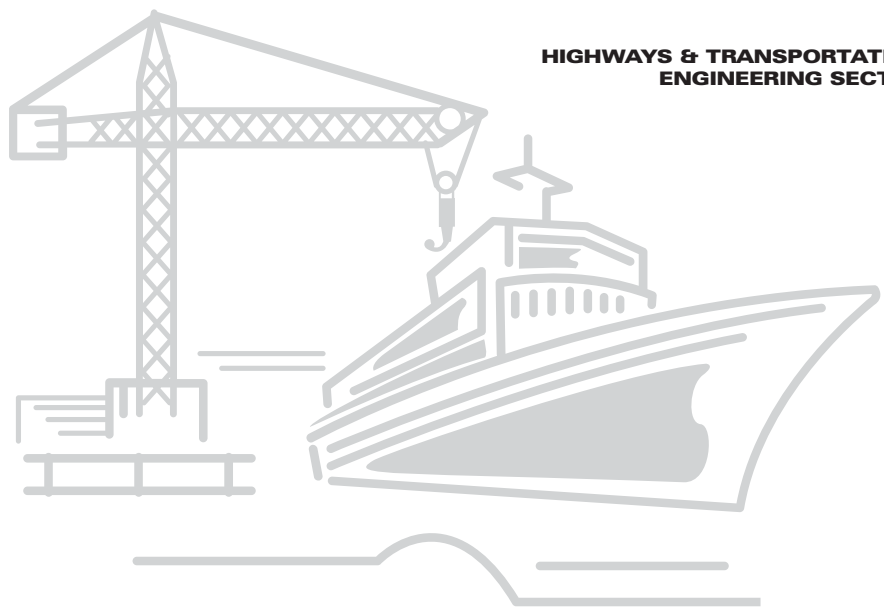
In the Seaports and Harbours Sector, NESPAK has acquired extensive experience and set a brilliant record in all aspects of ports and harbours and other maritime engineering consultancy services. The Company's expertise now covers all aspects of development of new ports/harbours, fish harbours, waterways and the improvement/rehabilitation of the existing marine structures. NESPAK has played a pivotal role in the planning and development of the existing and proposed seaports in the country, viz., Port Qasim, the Karachi Port and the Gwadar Port. Besides, it has been active in the Republic of Yemen and the State of Qatar by providing consultancy services for the Port of Mokha, Ras Issa Crude Oil Export Facility, Al-Saleef Port Silos, Reconstruction of Nishtoon and Al-Khawabah Fishery Ports and Al-Ruwais Port, Qatar.

SCOPE OF SERVICES

Facility Planning: Optimisation of design and cost-effective phasing of development including master plans, harbour layouts, jetties, terminals and facilities layouts and planning of development stages for both large and small projects.

Hydraulic Surveys: NESPAK provides analysis on oceanographic surveys, multi-beam surveys, Met ocean data, tidal studies, waves and current measurements, suspended sediment sampling, e.t.c. These studies are carried out through specialised hydrographers/surveying companies.

Hydraulic Model Studies: Physical and numerical modelling studies for alignment of jetties, navigation channels and breakwaters are carried out in association with qualified hydraulic laboratories.



Surveys and Investigations Studies:

Topographic surveys, geotechnical investigations, traffic and cargo forecast studies, economic, financial and environmental scoping studies, Initial Environmental Examinations, Environmental Impact Assessment.

Water Front Structures/Facilities: Retaining walls, dry docks, ship lifts, mooring and berthing dolphins, catwalks, spillways, docks and locks, pipelines, warehouses/transit sheds, workshops, freight stations, service buildings and fire-fighting systems.

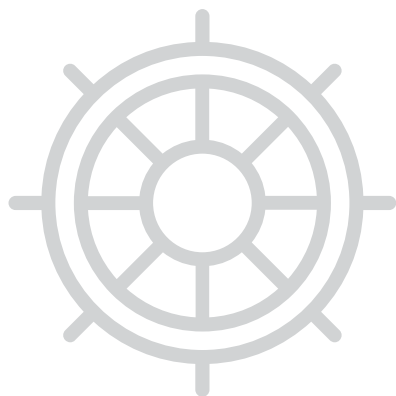
Dredging and Reclamation: Planning for capital and maintenance dredging works for channel, berthing basin and optimisation of port deepening programme, disposal of spoils, hydraulic and environmental impact of dredging, land reclamation, e.t.c.

Selection of Cargo and Materials Handling Equipment and Systems: Selection of equipment and design of systems for ports including pipe lines, cranes, ship loaders/unloaders, truck loaders/unloaders, stackers, reclaimers, conveyor systems, bagging, de-stuffing, palletising, liquid and dry storages.

Construction Planning and Management: Procurement and contract management (conventional contracts, EPC and BOT contracts), PC-I preparation, construction supervision, quality assurance, safety and security, scheduling and cost control, inspection/testing, commissioning and documentation.

EXPERIENCE

Since its inception in 1973, NESPAK has worked in Pakistan and abroad on various projects in the Seaports and Harbours Sector.



The depth of experience acquired over these years is summarised below:

Deep Seaports: Planning of three deep seaports for vessels up to 75,000 Dead Weight Tonnes (DWT) including navigation channel and multipurpose and dedicated berths. Engineering and supervision of a green-field project for development of a new deep seaport from planning to operation stage.

Fish Harbours: Planning and studies for a fish harbour in the country and two fish harbours abroad with off-shore infrastructure like quay wall, berths, breakwater, e.t.c., and onshore facilities such as auction halls, state-of-the-art shrimp peeling units, flake ice plants, cold storages, etc.

Fixed and Floating Jetties: Planning, feasibility, design and construction supervision services for jetties, quay walls, piers, wharves, and berths.

Breakwaters: Planning and designing of breakwaters, rock revetment structures and optimisation of breakwater layouts for reducing the siltation rates.

Inland River Navigation: Planning and comprehensive techno-economic study for 600 kilometres of inland river navigation system (Karachi to Sukkur) including navigation channel design, ship sizing, passenger terminals, e.t.c. to explore alternative mode of transportation.

- Concept design, preparation and evaluation of Build-Operate-Transfer (BOT) documents, design vetting, construction quality audit and project monitoring have been carried out for the following terminals;

Petro-chemical Terminals: NESPAK provided services for marine oil terminals handling oil tankers up to 75,000 DWT vessels consisting of mooring dolphins, breasting dolphins, loading platform, approach trestle and 4km causeway all on driven tubular steel piles.

Bulk Liquid Terminals: NESPAK rendered services on bulk liquid terminals consisting

of mooring dolphins, breasting dolphins, loading platform handling 35,000 DWT vessels, approach trestle and 0.25km long causeway on driven tubular steel pipes including loading arms, piping, firefighting services and dredging from the berth up to approach channel.

Grain and Fertilizer Terminals: NESPAK provided consultancy services for the grain and fertilizer terminals consisting of 350 meter dedicated berth for handling 75, 000 DWT vessels, ship to shore cranes for loading and unloading grain fertilizer, transfer system (conveyor belt) for transferring ship to storage facility, silos for the storage of grains, covered sheds for storage of fertilizer, bagging plant, dedicated power plant, sea water pump station for firefighting, hydrography, dredging and reclamation works.

Coal, Cement and Clinker Terminals: NESPAK offered services on Coal, Cement and Clinker Terminals consisting of jetty for handling ships up to 75,000 DWT in the main navigational channel of the Port Qasim and 3km trestle which carries conveyor belt for transfer of cargo to and from ship to backup area and driveway. The Terminal is equipped with state-of-the-art equipment (ship-to-shore cranes), conveyer belts and storages bilo and storage bins. The handling capacity of the terminal is up to 20 million tonnes per annum.

Multipurpose Cargo Terminals: NESPAK rendered services for the Establishment of Environment-friendly Multipurpose Bulk Cargo Terminal at East Wharf of Karachi Port by converting the newly constructed berths 10 to 17 into coal and dry bulk cargo terminals and assist the Karachi Port Trust in procuring the concessionaire.

Container Terminals: NESPAK provided services on three state-of-the-art container terminals with a combined capacity to handle over 1,000,000 Twenty-Foot Equivalent Units (TEUs) per annum, equipped with ship-to-shore gantry cranes, rubber tyred gantries, loaders, handlers and computerised tracking system.





Karachi Fish Harbour Modernisation Project



NESPAK being the sole Pakistani consultant with the expertise to design a modern fish harbour according to the international standards, was engaged by the Karachi Fish Harbour Authority for this Rs. 7 billion project.

NESPAK completed feasibility study, upgradation of master plan, condition survey, detailed design and tender documentation for this important venture. The design was carried out for the acceptance of the European Union Commission which monitors the general hygienic conditions of the harbour every year.

Coal, Clinker and Cement Terminal, Port Qasim, Karachi



NESPAK provided consultancy services on Coal, Cement and Clinker Terminal consisting of a jetty for handling ships up to 75,000 DWT in the main navigational channel of the Port Qasim and a 3km trestle which carries conveyor's belt for cargo transfer. The Terminal is equipped with the state-of-the-art equipment (Ship-to-shore cranes), conveyer belts, storages silo and storage bins. The handling capacity of the Terminal is up to 20 million tonnes per annum.

NESPAK services included bidding documents on BOT basis, preparation of implementation agreement, design vetting, construction quality audit and certification for commissioning of the project. The project was executed by the Pakistan International Bulk Terminal on the BOT basis at a cost of Rs.11 billion.





Pakistan International Container Terminal

NESPAK conducted master planning, surveys, inception report, concept design report, detailed design, tender documentation and construction supervision of the Pakistan International Container Terminal costing Rs. 11 billion.

The project consists of two berths of 600 metres for handling panamax container vessels. The Terminal is equipped with modern container handling equipment including 6 ship-to-shore quay side gantries, 20 rubber tyre gantries, 15 reach stackers, 2 top loader, empty container handlers, fork lifters and other container handling equipment, 250 fixed reefer outlets for handling refrigerated containers and an independent self generating power plant.



Environment-friendly Multipurpose Bulk Cargo Terminal

The project aims at the conversion of existing 10-17 berths of east wharves of the Karachi Port Trust into a multipurpose terminal to handle coal and dry bulk cargo. NESPAK scope of services includes inception study, site location study, terminal planning and environmental scoping/Initial Environmental Examination study, financial and economic feasibility study, project implementation framework study, preparation of Public-Private Partnership (PPP) procurement documents with concession agreement, evaluation of technical and financial proposals and assistance in negotiations and the award of PPP contract. The project costing Rs. 50 billion was awarded by the Karachi Port Trust.



Ship Lift and Transfer System at Karachi Shipyard

NESPAK is involved in the design vetting and construction supervision of Marine and General Civil Works for Ship Lift and Transfer System at the Karachi Shipyard, costing Rs. 4 billion. The scope of work includes the augmentation of Ship Repair Facility by acquiring a Ship Lift and Transfer System for vessels up to 7,500 DWT. The new system will be capable of repairing up to 13 vessels at a time.

Awarded by the Karachi Shipyard and Engineering, the project includes quay structure, jetty, terminal area and repair stations, rail network for transferring ships to their respective repair stations, dredging works, sheet piling, concrete bored piling, and secant piling and racked piling works.



Fauji Akbar Portia Grain and Fertilizer Terminal



NESPAK prepared feasibility study, surveys, inception study, preliminary concept study, construction methodology, design vetting and construction supervision of the Rs. 8 billion Fauji Akbar Portia Grain and Fertilizer Terminal.

The project comprised a dedicated 350m berth for handling 75,000 DWT vessels, ship-to-shore cranes, Transfers system (conveyor belt), grain silos, covered sheds, bagging plant, power plant, seawater pump station, hydrography and dredging and reclamation works. The terminal is capable of handling cargo up to 4 million tonnes per annum.



FOTCO Marine Oil Terminal, Port Qasim



NESPAK prepared feasibility study, surveys, inception report, preliminary concept study, construction methodology, design vetting, construction supervision and certification for commissioning of the FOTCO Marine Oil Terminal, Port Qasim.

Awarded by the Fauji Oil Terminal and Distribution Company Limited, the Terminal comprised a jetty handling oil tankers up to 75,000 DWT vessels, consisting of mooring dolphins, breasting dolphins, loading platform, approach trestle and 4 km long causeway. The terminal is capable of handling cargo up to 9 million tonnes per annum.

Nishtoon Fishery Port Improvement Project, Yemen



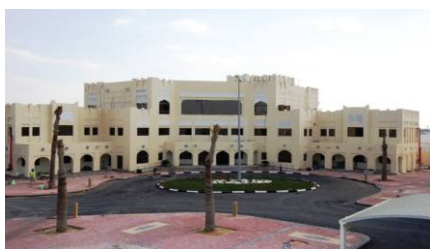
NESPAK completed consultancy services for the World Bank-funded Nishtoon Fishery Port Improvement Project in Yemen. The client highly praised the professional services of NESPAK and professional acumen of its staff in completing the project in one of the remote areas of Yemen.

NESPAK carried out design review of quay wall, breakwater, dredging works, allied infrastructure facilities, environmental studies, optimisation of functions and facilities and construction supervision of this US\$ 50 million project.

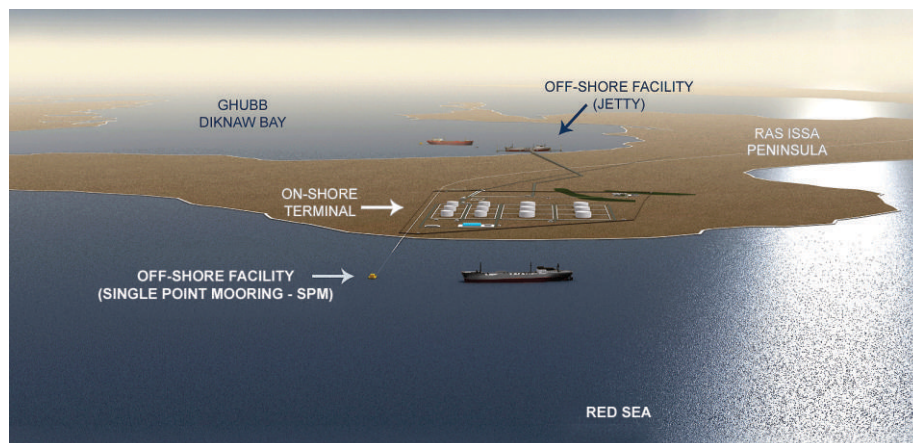


Al-Ruwais Port (Package-II), Qatar

NESPAK supervised the construction of “Development of Al-Ruwais Port (Package-II)” Project costing US\$ 10 million in the State of Qatar. The project was spread over 34,576 square kilometres with a total covered area of 5,596 sqkm. The components of the project included boat parking area, administration and accommodation buildings, ice factory, painting workshop, guard house, fire pump room, fire water tank, portable pump room and substation. The US\$ 10 million project which is considered a milestone in the ongoing work at the Al-Ruwais Port was awarded by the Private Engineering Office, State of Qatar.



Ras Issa Oil Terminal Project, Yemen



NESPAK was engaged by Yemen Oil and Gas Corporation for setting up a crude oil export terminal at the Ras Issa Peninsula on the Engineering, Procurement, Construction (EPC) basis.

NESPAK scope of services included the study of existing facilities and data collection, feasibility study review, conceptual design, tender documentation, evaluation and assistance to the client in award of work and review and approval of detailed engineering design.

The US\$ 244 million project comprised onshore works – storage, pumping and metering facility and offshore works –the installation of new SPM.