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AREAS OF EXPERTISE

- Flood Mitigation and Floodplain Management
- Assessment and design of drainage infrastructure
- Analysis of hydrologic and hydraulic data using Geographic Information System (GIS) and 1- and 2- dimensional dynamic, and complex hydrologic and hydraulic modeling softwares (integrated with GIS)
- Integrated Stormwater Management Planning
- Assessment and development of Best Management Practices (BMP) and Low Impact Development (LID) measures for Urban Stormwater Management

EMPLOYMENT BACKGROUND

September 2013 – To date
Associate Professor
Civil and Environmental Engineering
North South University
Dhaka, Bangladesh

Januray 2016- To date
Director, IQAC
North South University
Dhaka, Bangladesh

November 2012 – August 2013
Assistant Professor
Department of Civil Engineering
University of Asia Pacific (UAP)
Dhaka, Bangladesh

August 2011 – May 2012
Assistant Professor
Department of Civil Engineering
British Columbia Institute of Technology (BCIT)
Burnaby, BC

August 2008 – April 2011
Water Resources Engineer
Urban Systems Ltd., Richmond, BC

October 2005 – July 2008
Water Resources Engineer
Associated Engineering Ltd., Burnaby, BC

January 1997 – August 2003
Research/Teaching Assistant
Purdue University, Indiana, USA

EDUCATION

Ph.D., Civil Engineering (Hydraulics and Hydrology), Purdue University, 2003
Research Topic: "Influence of Run-on on Field-scale Surface and Subsurface Water and Contaminant Movement over Spatially Variable Hillslopes"
Major Professor: Dr. R.S. Govindaraju

MS, Civil Engineering (Hydraulics and Hydrology), Purdue University, 1998
Research Topic: "Influence of First Order Degradation on Spatial Moments of the Convection-Dispersion Equation with Kinetic Sorption"
Major Professor: Dr. R.S. Govindaraju

B.Sc., Civil Engineering, Bangladesh University of Engineering and Technology (BUET), 1995

TEACHING / RESEARCH EXPERIENCE

09/2013 to to-date: Associate Professor, Civil and Environmental Engineering, North South University.
-Courses taught:

- CEE 110: Computer Aided Drawing
- CEE 100: Introduction to Civil and Environmental Engineering
- CEE 211: Fluid Mechanics
- CEE 260: Hydrology
- CEE 360: Open Channel Flow
- CEE 460: Groundwater Hydraulics

11/2012 to to-date: Assistant Professor, Department of Civil Engineering, University of Asia Pacific (UAP).
- Courses taught:

- CIVL 361: Open Channel Flow
- CE 363: Engineering Hydrology
- CE 107: Introduction to Civil and Environmental Engineering
- CE 222: Open Channel Flow Laboratory Experiments
- Supervised four (4) undergraduate theses.

08/2011 to 05/2012: Assistant Professor, Department of Civil Engineering, British Columbia Institute of Technology (BCIT).
- Courses taught :

- CIVL 7060: Introduction to Environmental Engineering (3rd year)
- CIVL 7062: Water Quality Engineering (4th year)
- CIVL 7020: Fluid Mechanics and Thermal Science (3rd year)
- CIVL 7061: Stormwater Management (4th year)

- Supervised 2nd year and 4th year CAPSTONE projects.

01/2003 to 05/2003: Graduate Teaching Assistant, School of Civil Engineering, Purdue University. Course taught:

- CE 344: Storm Sewer System Design.

06/2002 to 12/2002: Graduate Research Assistant, School of Civil Engineering, Purdue University.

08/2000 to 05/2002: Graduate Research Assistant, School of Civil Engineering, Purdue University. Worked on " Decision Model for Water Quality Protection at INDOT Maintenance Facilities" jointly funded by Indiana Department of Transportation (INDOT) and Federal Highway Administration (FHWA).

05/2000 to 07/2000: Worked as GIS analyst in the Department of Agricultural and Biological Engineering, Purdue University.

08/1997 to 05/2000: Graduate Teaching Assistant, Department of Freshman Engineering, Purdue University. Taught the laboratory section of the course ENGR 106: Introduction to Computer Tools for Engineers.

05/1997 to 07/1997: Graduate Teaching Assistant, School of Civil Engineering, Purdue University. Course: CE 350: Introduction to Environmental Engineering.

SUPERVISED UNDERGRADUATE THESES

"Community based Rainwater Harvesting in Dhaka City" by Shamim Ahmed Khan, Sumiya Mahzabin, Fariha Enam, M. Arafat Hossain; May 2014, University of Asia Pacific, Dhaka, Bangladesh.

"Climate Change Impact on Flooding and Water Logging in Dhaka City" by Md. Shahjahan, Md. Babul Hossain and Md. Ibrahim Nayeem; May 2013, University of Asia Pacific, Dhaka, Bangladesh.

"Modeling of Rainwater Harvesting System in High Rise Buildings of Dhaka City" by Shafayet Ahmed, Rezaul Hasan and Mohiuddin Sarker; May 2013, University of Asia Pacific, Dhaka, Bangladesh.

"Assessment of Waterbodies of Dhaka City" by Md. Sabbir Uddin Khan and Shumia Islam; May 2013, University of Asia Pacific, Dhaka, Bangladesh.

EXTERNAL SUPERVISION OF MASTERS THESES

"Climate Change and Gender Vulnerability: A case study of gender sensitive adaptation to climate change in coastal part of Bangladesh" by Khodeza Hossain, 2014, North South University (NSU) , Dhaka, Bangladesh.

"Feasibility of using Shitalakhya river water as makeup water in Siddhirganj power plant cooling system" by Md. Abu Zafer Siddik, 2014, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh.

JOURNAL PUBLICATIONS/BOOK CHAPTER

"A Numerical Evaluation of the Role of Run-on on Sediment Transport over Heterogenous Hillslopes," **N. Nahar**, R.S. Govindaraju, C. Corradini and R. Morbidelli. Journal of Hydrologic Engineering, Vol. 13(4), pp 215-225., 2008.

"Infiltration and Run-on under Spatially Variable Hydrologic Properties," Govindaraju, R.S., C. Corradini, R. Morbidelli, and **N. Nahar**, in Handbook of Groundwater Engineering, ed. J.W. Delleur, 2005.

"Role of Run-on for Describing Field-Scale Infiltration and Overland Flow Over Spatially Variable Soils," **N. Nahar**, R.S. Govindaraju, C. Corradini and R. Morbidelli. Journal of Hydrology, Vol 286/1-4 pp 36-51, 2003.

CONFERENCE PUBLICATIONS

"Community Based Rainwater Harvesting in Dhaka City", Khan, S. A., Hossain, M. A., Mahjabeen, S., Raisa, F. E., and **Nahar, N**, International conference on Climate Change in relation to Water and Environment [I3CWE-2015], April 2015.

"Run-on and Sediment Transport over Hetergeneous Hillslopes," **N. Nahar**, R.S. Govindaraju, C. Corradini and R. Morbidelli. 32nd IAHR Congress, Venice, Italy, 1-6 July 2007.

"Quantifying the Influence of Spatial Variability on the Run-On Process: A Numerical Study," **N.Nahar** and R.S.Govindaraju,. World Water and Environmental Resources Congress, Salt Lake City, Utah, 27 June–1 July 1 2004.

"Solute Transport by Surface and Subsurface Water with Run-on on Spatially Variable Hillslopes," **N.Nahar** and R.S.Govindaraju. ICHWAM-2002 Conference by J.N.T.University, Hyderabad, India, 18-20 December 2003.

"Surface Runoff and Infiltration with Run-on on Spatially Variable Hillslopes," **N.Nahar** and R.S.Govindaraju. Proceedings of the Second Federal Interagency Hydrologic Modeling Conference held in Las Vegas, Nevada, USA, 28 July-1 August 2002.

"Influence of First-Order Degradation on Spatial Moments of the PNE/CNE Model," **N. Nahar**, R.S. Govindaraju. American Society of Civil Engineers (ASCE) International Water Resources Engineering Conference in Seattle, Washington, 8-11 August 1999.

PROFICIENCY IN ANALYTICAL/DESIGN SOFTWARES

- ArcView GIS
- Manifold GIS
- HEC-RAS
- XP-SWMM
- PCSWMM
- EPA-SWMM
- MIKE SHE
- MIKE 11
- UBC Watershed Model

- Water Balance Model
- MATLAB
- AutoCAD

PROJECT EXPERIENCE

Integrated Stormwater Management Plan for Old Logging Ditch and Burrows Ditch Watersheds, City of Surrey, BC:

The project involved developing an Integrated Stormwater Management Plan for Old Logging Ditch and Burrows Ditch Watersheds that includes agricultural areas in the north and residential areas in the south. The objective of the ISMP was to recommend stormwater management strategies for the upper development that also conforms to the lowland management strategy. Major responsibilities included detail hydrologic and hydraulic modelling using MIKE SHE and MIKE 11 under both present and future conditions. MIKE SHE is an integrated physically based model that simulates different physical processes i.e. infiltration, evaporation, transpiration, and runoff and integrates seamlessly with the hydraulic model in MIKE 11. Responsibilities also included cost estimates for different management strategies.

Stormwater Servicing Plan for City of Surrey Neighborhoods, BC

The project involved developing stormwater servicing strategies for neighbourhoods in the City of Surrey (Newton Town Centre; Anniedale / Tynehead). Major responsibilities included hydrologic and hydraulic analysis to develop feasible and efficient servicing strategies focusing on "low impact development"/"best management practices" to reduce runoff volume and provide runoff quality benefits for receiving watercourses. Generally NCP studies involves review of background and site information; simulating runoff conditions with computer modeling; formulating and assessing with the model alternative management strategies; coordination with City staff; reporting; and participation in consultation processes.

Port Mann / Highway 1 Design and Build Project, H5M Consortium, BC

The Port Mann / Highway 1 Project (PMH1) upgrades the transportation corridor of Canada Highway 1 from approximately Hastings Street (Cassiar Tunnel) in Vancouver to the 200th Street Interchange in the City of Surrey, a distance of roughly 33 kilometers. In addition to constructing a new 10-lane crossing of the Fraser River, in general the highway will be expanded from 4 to 6 (or 8) lanes and interchanges along the route will be improved. The Project includes improvements to the existing drainage infrastructure within the Project corridor in order to provide a consistent level of service throughout and to avoid or mitigate negative impacts on the highway and on adjacent lands, streams and other drainage infrastructures. Major responsibilities included modelling and assessment of integrity and capacity of the existing drainage system as well as the proposed drainage system to accommodate the proposed highway expansion and reconstruction. The work also includes development of stormwater management plan for two watersheds (out of four) impacted by the change in the existing highway design.

Coquitlam Watershed Review, BC

The project involved development of a comprehensive drainage plan for the Partridge, Mantle and Fulawka Creeks watersheds. The presence of multiple stakeholders, several occurrences of landslides in the Fulawka Creek and water quality in the Coquitlam River are some of the key issues to be dealt with. In consultation with the City, a phased approach was adopted that includes the 1) Scoping study, 2) Comprehensive study and preliminary design and 3) Detailed design and

implementation. Phase I was completed in February 2009. Major responsibilities were to review and assess background information and site conditions, identify opportunities and constraints, formulate preliminary mitigative actions, assist with stakeholder communications, and prepare a work program for a suggested course of action. The Phase II work completed in April 2011.

City of Langley Integrated Stormwater Management Plan (ISMP), City of Langley, BC

The project objective was to develop an Integrated Stormwater Management Plan that primarily included identification of habitat and environmental values, opportunities and constraints, complete assessment of aquatic health and water quality, and review of infrastructure from Asset Management and Capital Planning perspectives. Responsibilities were conducting the analytical works including evaluation of the existing and future land use scenarios and drainage condition, identification of the critical components that should be included in the ISMP, Identification of streams potentially impacted by the development, and managing project schedules and budget.

Country Hills Crossing Staged Master Drainage Plan, Melcor Developments Ltd., AB

The Staged Master Drainage Plan (SMDP) was developed for the proposed Country Hills Crossing Industrial Development, which is located at the northeast industrial area of Calgary, AB. The 58.23 ha area is predominantly agricultural with the cultivated land in the upper terrace being separated from the grassland in the lower terrace by an escarpment. The Staged Master Drainage Plan includes proposed stormwater detention facilities, overland drainage routes, water quality improvement facilities, and Low Impact Developments (LID) to mitigate the impact of development on the environment.

Hyland Creek Pond 3 Feasibility Assessment, City of Surrey, BC

The Hyland Creek Integrated Stormwater Management Plan (ISMP) (Urban Systems Ltd., 2007) recommended construction of three ponds to service this area (namely, the northern part of Zone 1 plus Zone 1A). The objectives of Hyland Creek Pond 3 Feasibility Assessment were to determine whether the need for two of these ponds could be eliminated by consolidating the detention storage on a single site in the Newton Town Centre area and what would be the impact of Pond 3 on the stream downstream in terms of erosion.

Greendale Flood Study, City of Chilliwack, BC

In January 2009, parts of the City of Chilliwack, most notably the Greendale area, experienced severe flooding due to a combination of heavy snowfall and severe rainfall. Due to the severity and atypical nature of the flood, the City wanted to investigate the event. The primary objectives of the investigation were to find out the probable factors that caused this event, the significance of the event and potential remedies to mitigate future damages. MIKE SHE and MIKE 11 were used for the hydrologic and hydraulic modelling.

Integrated Stormwater Management Plan for Erickson Creek, City of Surrey, BC:

The project involved developing an Integrated Stormwater Management Plan for Erickson Creek watershed. This includes agricultural areas in the north and residential areas in the south. Major responsibilities included detail hydrologic and hydraulic modelling using XP-SWMM and GIS and analysis of the drainage conditions under both present and future. The objective of the ISMP

was to provide stormwater management strategies for upland development that also conforms to the lowland management strategy.

Flood Plain Bylaw Analysis, City of Kelowna, BC:

The objective of this study was to analyze the 200-year flood profile along the Mill creek and to produce a feasible floodplain map that would lead to establishment of an effective floodplain bylaw in accordance with Section 910 of the Municipal Act. The study involved complex analysis of the dependencies among Mill creek, Mission creek and Okanagan lake systems. For hydraulic analysis and flood plain delineation, HEC-RAS and GIS were used. Responsibilities included management of the project, conduct analysis and provide direction/guidance to the modeller, liaison with client and preparation of the report.

Rodgers and Marr Creeks Integrated Stormwater Management Plan, District of West Vancouver, BC:

The main objective of the project was to develop an Integrated Stormwater Management plan for Rodgers and Marr Creek Watershed in West Vancouver. Major responsibilities included data analysis using GIS and detail hydrologic and hydraulic analysis integrating XP-SWMM and GIS. Prepared draft report including alternative management strategies and recommendations to reduce the impact of development on watershed health and ensure the integrity of the creeks.

Foreshore Improvement Plan for Bermuda International Airport

This project was intended to develop foreshore improvement plan for Bermuda International Airport. The investigation focused on two main options: grading improvements within the currently available land base including restoration of the existing foreshore retaining wall; and, foreshore infilling and erosion protection to allow relocation of existing South Perimeter Road to an alignment further setback from the runway. Responsibilities included designing shore protection structures, and preparing report.

Harmony Estates Lower Hyde Creek Development, Coquitlam, BC:

Major responsibilities included development of conceptual design of stormwater management plan for a 45-lot subdivision. Assessed pre-and post-development conditions and recommended feasible stormwater management strategies using SWMM 5.0. Recommendation included Low Impact Development techniques with analysis being done in Water Balance Model (WBM). Responsibilities also included dealing with client, and preparing report.

Flood Plain Evaluation for Brooklyn Creek, Town of Comox, BC:

The project involved assessment of the current floodplain condition, and more specifically analysis of the elevation and capacity of the Balmoral Avenue culvert to determine the potential of failure. Also to assess the risk posed by any such failure. Responsible for hydrologic and hydraulic modelling in Visual HYDRO, report preparation including recommendations regarding specific modifications to reduce the risk of failure at the Balmoral Avenue culvert, and evaluating the effects of the Prichard Road high flow diversion. Also investigated whether this infrastructure provides a basis for reducing the Flood Control Levels and setbacks prescribed in the Town Bylaw.

Ernie Winch Park, City of Burnaby, BC:

The main objective of this project was to perform feasibility assessment of Byrne Creek daylighting within Ernie Winch Park in Burnaby. Besides daylighting, other viable options such as having a detention pond or a wetland were considered. Responsibilities included completion of hydrologic and hydraulic analysis of the existing drainage system and feasibility study of daylighting Byrne Creek along with a two-stage water quality
pond, management of project schedules and report preparation.

Watershed Yield Study for the City of Nanaimo, BC:

This project involved watershed yield study of Nanaimo watershed. A dam and reservoir was proposed on the South Nanaimo River. The new reservoir would provide additional storage for drought periods and future demands. Major responsibilities included detailed analysis of the watershed yield using UBC Watershed Model. Using daily maximum and minimum temperatures and precipitation data, the UBC Watershed Model calculates daily watershed outflow resulting from snowmelt and rainfall. The effect of climate change on the watershed yield was also investigated as part of the assessment, using the Canadian CGCM3 climate model.

Willoughby Community Park Stormwater Management Plan, Township of Langley, BC:

Developed Stormwater Management Plan for Willoughby Community Park in Township of Langley. The recommended facilities included conceptual design of two-phase detention ponds conforming to the park Master Plan, and Low Impact Developments (LID) to comply with Latimer Creek Master Drainage Plan (MDP). Responsibilities included management of the project, detail modelling and analysis using SWMM 5.0, liaison with client and preparation of final report.

Percy Perry Park Artificial Turf Drainage Investigation, City of Coquitlam, BC:

This project involved investigation of the drainage problem occurring in the Percy Perry Artificial Turf Field. Ponding was observed on the field even during a typical storm event. Responsibilities included detail analysis of different drainage components of the turf field, investigation of the product test results from manufacturers and the designers, management of the project, analysis of the drainage problem, recommendation of possible solutions and report preparation.

OTHER PROJECTS

Stormwater Drainage Plan for Cranbrook Airport Runway Extension, Cranbrook Airport Authority, BC:

Designed stormwater drainage plan to maintain safe and efficient operation of the airport. Goals were to prevent flooding, maintain water quality in the receiving water bodies, protect fish habitat and mitigate potential erosion and sedimentation problems. Developed hydraulic and hydrologic model in SWMM 5.0, analyzed pre-development and future development conditions for 10-year storm event, and provided recommendations for minimizing development effects through detention ponds and grassed swales.

Mosaic Homes Stormwater Management Plan, Burnaby, BC:

Involved with development of stormwater management plan for redevelopment of a 5.59 ha site.

Responsibilities included investigation of available alternatives to manage extreme event runoff. Options included detention storage at two locations within the development site, online detention storage in a nearby gulley, diversion of flows to the adjacent Byrne Creek, and over controlling upland flows to compensate for increased flows resulting from the development. Prepared draft report.

Guildford Detention Pond Review, City of Surrey, BC:

Feasibility analysis of a community detention pond proposed at 15399 Guildford Drive in Surrey. Developed detailed hydraulic and hydrologic model based on the City's GIS database using XP-SWMM. Performed detail analysis of the existing small lot detention facilities and feasibility analysis for the proposed detention pond.

Metropolis Tower 3: Stormwater Management Plan, City of Burnaby, BC:

Responsibilities included preparation of stormwater management plan (including estimate for maintenance). Mechanical sub-consultant and landscape architect were also involved with the project.

Hydrologic and Hydraulic Analyses of Ungauged Watersheds throughout BC:

Conducted numerous hydrologic and hydraulic analyses of ungauged watersheds throughout BC for resource road development, highways and municipal clients. These assignments have provided the basis for sizing culverts and bridge spans. And included flow estimation using various methods, and frequency analyses using Consolidated Frequency Analysis (CFA) software.

Downes Creek Integrated Stormwater Management Plan, City of Abbotsford, BC:

The Downes Creek watershed is experiencing significant development including single family residential lots, institutions, and commercial developments. Responsibilities included development of a GIS data platform to be used for hydrologic and hydraulic modelling in XPSWMM.