DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

Bawana Road, Delhi-110042

## CANDIDATE'S DECLARATION

I, (Saurabh Tayal, 2K16/HFE/15 Student of M.tech (Hydraulics and fluid engineering),hereby declare that the project Dissertation titled 2D Flood Modeling using HEC RAS which is submitted by me to the department of civil engineering, Delhi Technological University, Delhi in partial fulfillment of the requirement for the award of the degree of master in technology is original and not copied from any source without proper citation. This work has not previously formed the basis for the award of any degree, Diploma Associateship, Fellowship or other similar title or recognition.

Place: New Delhi SAURABH TAYAL

Date:

CIVIL ENGINEERING DEPARTMENT

DELHI TECHNOLOGICAL UNIVERSITY

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## CERTIFICATE

I hereby certify that the project Dissertation Titled ‘‘2D FLOOD MODELING USING HECRAS” by Saurabh Tayal, 2k16/HFE/15, Civil Engineering Department, Delhi Technological University in partial fulfillment of the requirement for the award of degree in Master in Technology, is a record of the project carried out by the student under my supervision. To the best of my knowledge this work has not been submitted in part or full for any degree or diploma to this university or elsewhere.

Place: Delhi

Date:

Mr. Rakesh Mehrotra

(Associate professor)

Department of civil engineering

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# ABSTRACT

Floods caused by over flowing river can have devastating effect on life and property resulting in economic loss. Modeling of floods is very important for planning, of mitigative measures and protection works. High intensity rainfall for Continous period in the catchment of the river can result in floods. Number of river basins in the Indian subcontinent regularly face floods in the monsoon seasons(80% of the annual rainfall happens in just 60 days time). To cope with such wide spread flood events affecting habitats and life of tens of crores of people flood prediction and the areas prone to flooding need to be identified for planning of damage control measures. Hydrological studies are the basic inputs for the calculation of the river flows. Protection works can be designed after consideration of the historical flows of 15, 25, 50, 100 year frequency. The spread of the flood caused by the overflowing river depends on the terrain of the flood plain this requires the contour maps/Digital Elevation Models of the area. Inundation mapping using contour maps and river flow data at the time floods/theoretical flood values can help in creating maps of terrains going to get affected by all kind of flood frequencies. Certain modern softwaresmake it very convenient to carry out inundation modeling using area DEM and differ river flow rainfall scenarios .Digital elevation models can be prepared from field survey data/contour maps on even remote sensed aerial data/satellite composite pictures of the terrain.

In this study, it is aimed to construct flood inundation maps for flooding caused due to North American River (wolf) and its two tributaries .Topographic data of the study area is defined for hydraulic model by sectioning along the river on digital terrain model (DTM) which is created by ArcGIS, a geographical Information System (GIS) software.

Data migration between ArcGIS and HEC RAS is provided by using an intermediate module, HEC GeoRAS After required geometrical and hydraulic structure data are constituted, flood inundation maps are obtained by inputing flow data into the model. The hydraulic simulation was performed under a subcritical steady flow regime for 100-year recurrence period for two downstream boundary conditions i.e for Normal depth and for known water surface elevation at downstream point.

Flood hydrograph is made for both river and tributaries at specific location for recurrence interval of 100 year. Hydrograph is made for month of December for 3 days for hydraulic

modeling as rainfall is more in month of December. As a result of hydraulic modeling-maximum flood depth, maximum velocity and area extent of submergence are found.

This present work deploys HEC-RAS software on wolf river system on a Pre-Processed Digital terrain model (DTM) of wolf river system basin of North America which was obtained from published source at (www.hydrosheds.cr.usgs.gov.in)The objective is to find extent of flooding and water surface elevation along the river for flood protection works.

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