

2 ACHIEVEMENTS

2-1 Aerial Photography

The aerial photography was carried out for the study area along the Pacific Ocean coastline of Nicaragua. Leica RC-30 Camera (f= 152 mm, 23 cm × 23 cm) with GPS mounted on aircraft was used. Black & White aerial photographs at a scale of 1/40,000 were taken for the Topographic mapping purpose in the Study area. Photographs covered about 12,000 km² with 33 courses, flight length of about 2,600 km. Also color aerial photographs on 1/20,000 scale was taken over the Telica-El Hoyo volcanic area for interpretation purpose of the volcanic hazard mapping.

In total, 288 colors and 814 black and white, aerial photographs were taken during the aerial photography mission. All photographs have 60% overlap and 30% sidelap as a standard technical specification for mapping purpose. All photographs were rasterized by a high precision scanner with a resolution of 20 microns.



Photo 2-1 Leica RC 30 Aerial Camera



Photo 2-2 Aircraft on the Ground

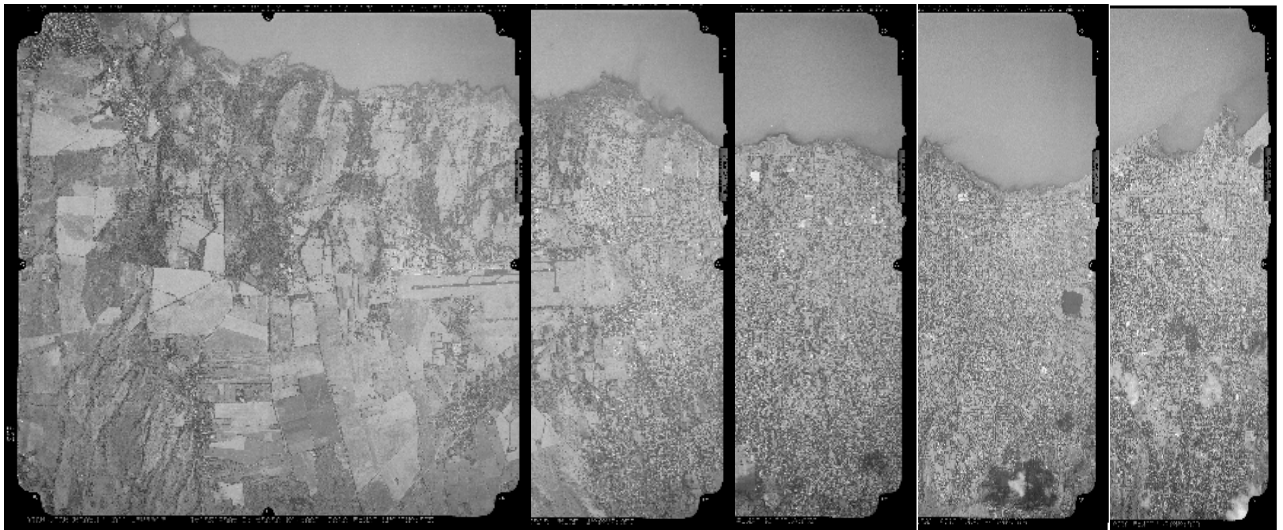


Figure 2-1 Black & White Aerial Photographs Over Managua City

2-2 Topographic Mapping in Managua (1/5,000)

Topographic maps at a scale of 1/5,000 were prepared for the Managua city area plus the watershed area of southern part for various purposes such as city planning, flood control, construction of reservoir and others. The large scale mapping was the first attempt in Nicaragua. The mapping system used the new coordinate system (WGS84 and UTM), the same as the basic map at a scale of 1/50,000, for the benefits of end users. Digital plotting was carried out to acquire road, house, public facilities and landmarks and others. The interval of the intermediate contour is two meters. Where distances between the intermediate contour lines become wide in flat areas, supplementary contour lines with an interval of one meter were inserted. The formats of the final data delivered were to be the DXF and DGN which were the general formats commonly accepted by end users such as INETER, the City of Managua, and ENACAL and others.

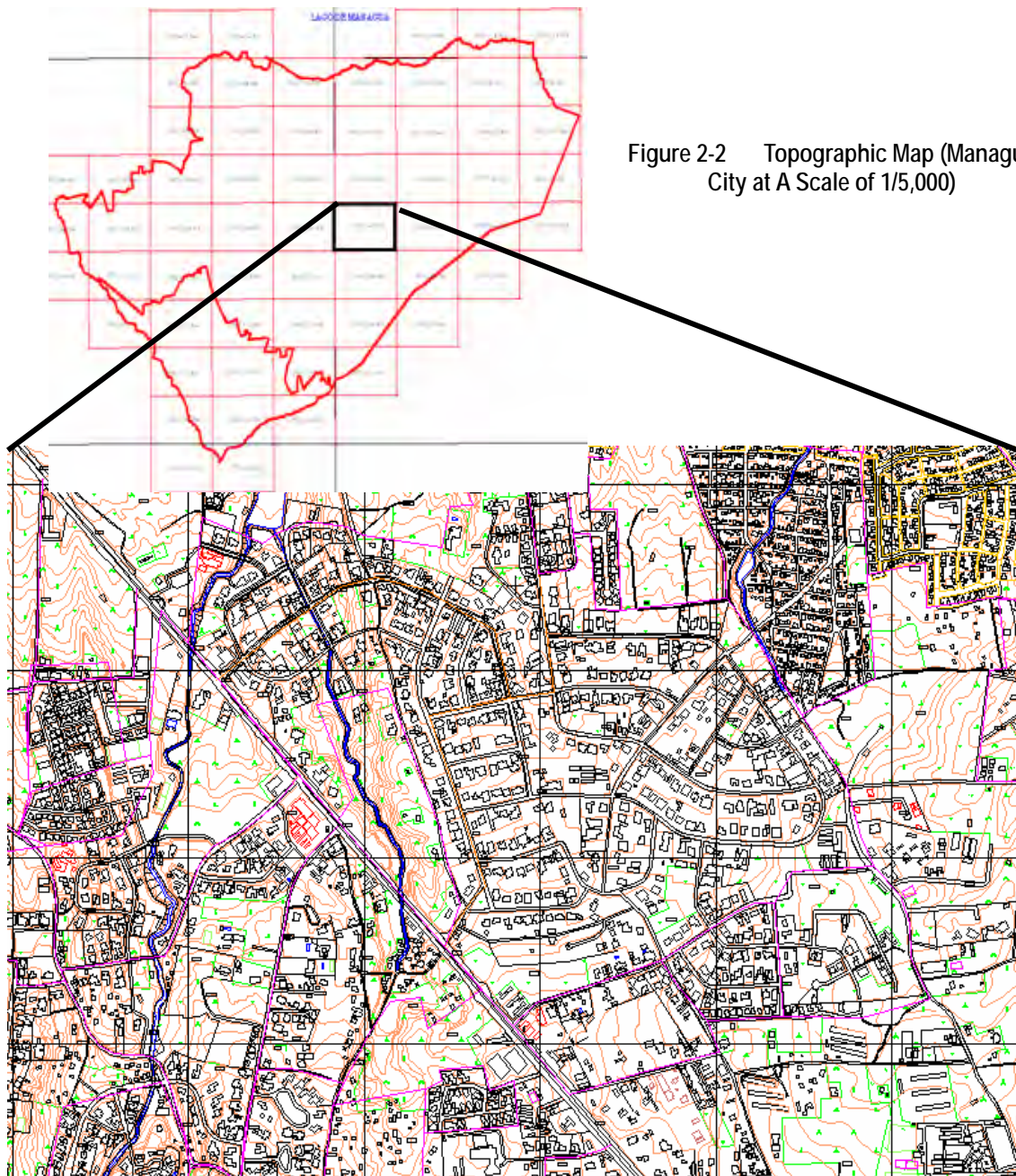


Figure 2-2 Topographic Map (Managua City at A Scale of 1/5,000)

2-3 Topographic Mapping (1/50,000)

Map symbols are required to be based upon the specification prepared by the country concerned. In the Republic Nicaragua, the cartographic representation of the geographic entities of the real world on maps is in accordance with the Manual of Specifications PS/3AA/101 “Specifications for the Production of Topographic Maps of Foreign Territories at a scale of 1/50,000” produced by Defense Mapping Agency in the United States. The contour line interval is 20m and the supplementary contour line is used every 10 meters in flat areas.

As for the projection and ellipsoid, Worldwide Geodesic System 1984 (WGS84) and Universal Transverse Mercator Projection (UTM) were adopted for the new system.

The printing color is divided in five layers which correspond to the colors cyan, magenta, yellow, and black (CMYK), and the sepia color for the contour lines.



Figure 2-3 Sample of Topographic Map

2-4 GIS Database of Infrastructures for Disaster Mitigation

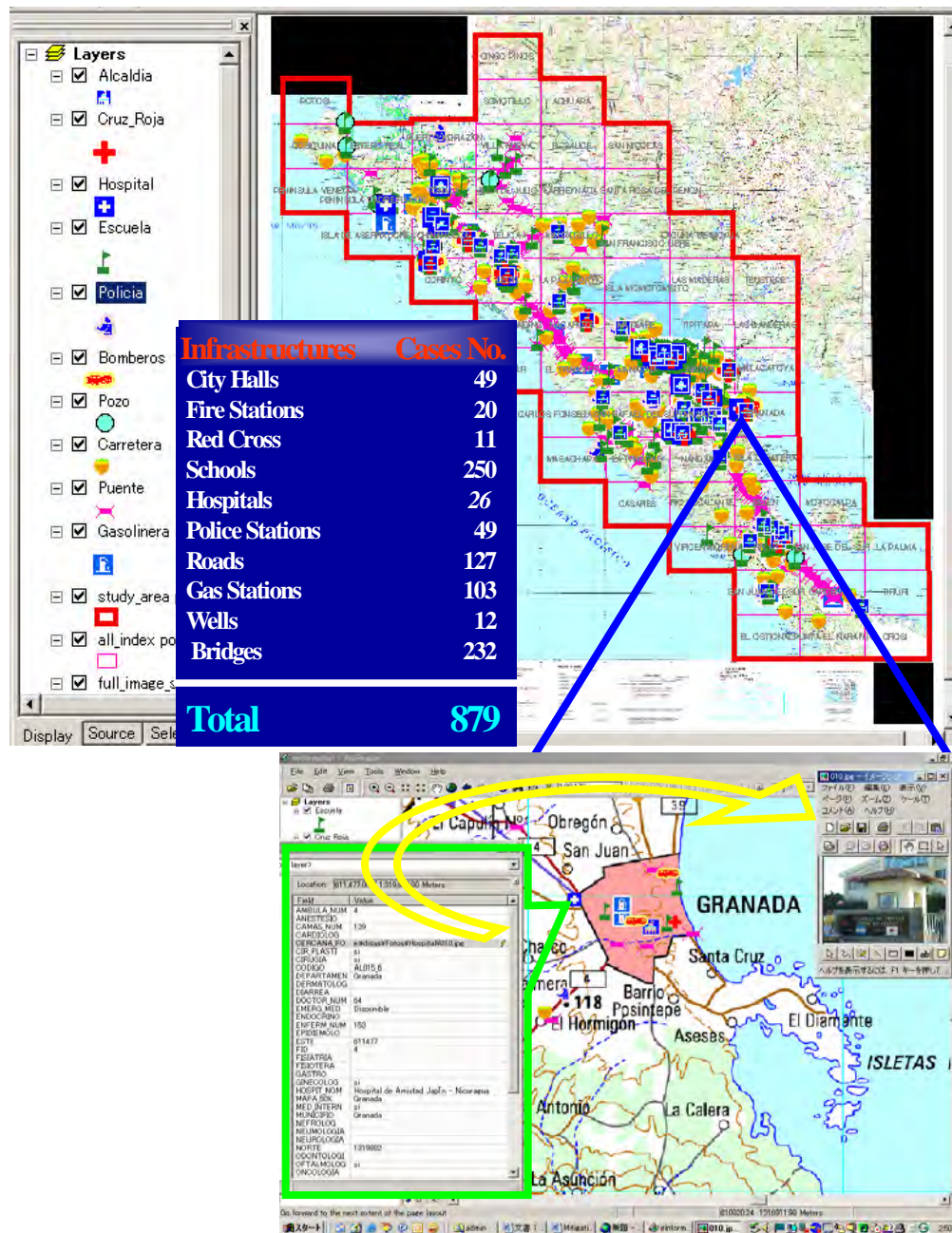


Figure 2-4 GIS Database of Infrastructures for Disaster Mitigation

Various types of information on basic infrastructures related to disaster mitigation have been organized as database files and then inputted into ArcGIS. All disaster mitigation related infrastructures have been symbolized, and a legible and appealing display system has been designed to show detailed information of each feature along with its images when it is clicked. Recently mapped 1/250,000 scale Topographic Raster Maps provided by INETER have been used as background in the display system. The information files are in the ArcGIS format so that the files can be used in INETER. And at the same time, for those who do not have access to ArcGIS, their PMF (Portable Map Format) format has been prepared which can be opened using ArcReader Product of ArcGIS. This product is freely downloadable from the ESRI (USA) Internet web site.

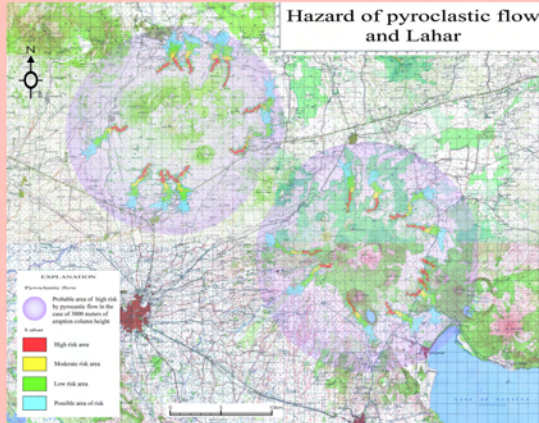


Mapa de Amenaza Volcánica II

-Hazard of pyroclastic flow, lahar and bomb in Telica-El Hoyo volcanic complex area-



2007



Base para la elaboración del mapa de amenaza

Los mapas de amenaza muestran los áreas potencialmente afectadas por las actividades volcánicas que pueden manifestarse bajo ciertas condiciones en base a los estudios científicos y la experiencia de campo.

Flujo pyroclástico: Se prevé la generación de flujos pyroclásticos equivalentes a los que se conformaron mediante la construcción de campo.

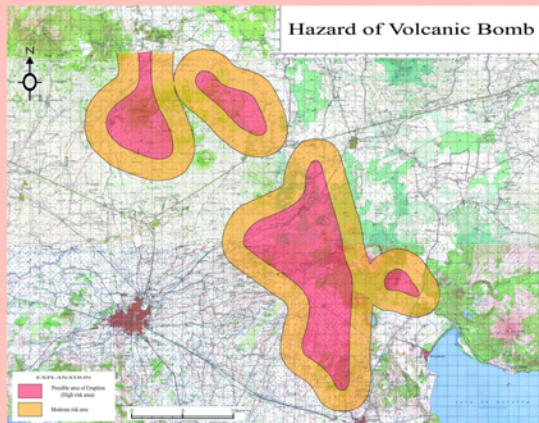
Bomba volcánica: Se define como área de peligro al área que está a 4 km del lugar en donde se genera la explosión del conito. Este área se prolonga independientemente de la intensidad de la explosión del conito.

Lahar: Se anticipa que en gran medida con el del Volcán Conito (1988) hasta como equivalente reciente correspondiente a un 1.20 de la de C. con. El lahar con el de C. conito volcánico fue un gran peligro de la actividad volcánica.

Usualmente, se produce lahar cuando los materiales pyroclásticos, cenizas volcánicas y arena son depositados en los taludes o valles del volcán y lagos nearby.

Flujo pyroclástico: Bases científicas de alta temperatura y gas cenizas al mismo tiempo la lahar, lahar a alta y gran velocidad. La velocidad puede superar los 100 km por hora y el flujo se controla pasado por encima de los centros paganos.

Debido que se trata volcán que es volcánico, los volcánicos del área probablemente afectada por el flujo lahar que avanzan lo más antes posible. Una vez atrapados en el flujo pyroclástico, las cenizas se agitan y las personas y el ganado quedan afectados.



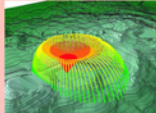
Photocredito: Foto de 1991 erupción de El Hoyo Volcán, Japan. Photograph(2011)



Photocredito: Foto de 1991 erupción de El Hoyo Volcán, Japan. Photograph(2011)

Bomba volcánica (continúa)

Con la erupción, se crea y produce de más de 10 cm de diámetro volcánico (bomba). Las bombas demoran los centos y cientos metros a horas a las personas. Como llegan muchas veces y profusa, el área que está a menos de 4 km del conito se encuentran peligrosos.



Lahar de gran potencia potencial a la ciudad de conito. Cuando se forman capas gruesas de depósitos pyroclásticos, arena y cenizas sobre los taludes de los conitos por las actividades volcánicas se forma los lahar (potencialmente flujos de arena y lahar). Especialmente en gran medida cuando el flujo de Telica, potencialmente flujos de lahar de gran potencia, que fluyen se acumulan sobre los taludes de los lahar.

Detail content of upper map

- Area that could be inundated by a lahar having a volume of 100,000 cubic meters
- Area that could be inundated by a lahar having a volume of 500,000 cubic meters
- Area that could be inundated by a lahar having a volume of 1 million cubic meters
- Area that could be inundated by a lahar having a volume of 5 million cubic meters



Estudio para el establecimiento Mapas básicos y Mapas de Amenaza para SIG en la República de Nicaragua

Pasco Corporation OYO International



Figure 2-7 Hazard Map 2 of Pyroclastic Flow, Lahar and Bomb