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GIS Sana Sini

The Establishment Of Kariah Boundary Using GIS

Lawatan Kerja Y.B. Dato' Seri Azmi bin Khalid dan Delegasi Ke Map World Forum 2007, Hyderabad, India

Development of Flood Risk Map for Sg. Selangor Basin


Terbitan :
Pusat Infrastruktur Data Geospatial Negara (MaCGDI )
Kementerian Sumber Asli dan Alam Sekitar (NRE)
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# KANDUNGAN




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## Dari Meja Ketua Editor

*Assalamualaikum dan Salam Sejahtera,*

Banyak perubahan telah berlaku di sekeliling kita tanpa kita sedari terutamanya dari segi fizikal, seperti tumbuhnya bangunan pencakar langit, pertambahan taman-taman baru dan sebagainya. Pertumbuhan atau pembangunan sesebuah kawasan baru boleh mendatangkan impak yang buruk sekiranya tidak dirancang dan diuruskan dengan baik. Isu alam sekitar semakin hari semakin menjadi topik hangat diperkatakan. Kian hari masalah alam sekitar kian meruncing. Terbaru, kita telah di kejutkan dengan berita kejadian banjir di Selatan tanah air yang telah memberi kesan dan melumpuhkan sistem pentadbiran tempatan. Bencana alam kali ini yang dicatatkan sebagai yang terburuk dalam tempoh 30 tahun semestinya mencetuskan suasana panik dan kelam kabut akibat tiada persediaan awal bagi menghadapi bencana tersebut. Para penyelidik boleh mengambil iktibar daripada bencana ini bagi menghadapi bencana alam tahunan, terutama di Pantai Timur dan membuat kajian terbaik dalam menangani permasalahan banjir ini. Akibatnya kerugian harta benda dan yang paling ditakuti kehilangan nyawa orang tersayang. Langkah perlu diambil bagi mengurangkan risiko kejadian yang sama berulang. Persediaan awal menangani bencana boleh dilakukan sekiranya ramalan dan jangkaan telah dibuat, iaitu dengan membuat analisis terhadap sumber-sumber atau data-data yang ada seperti data pergerakan orang awam, angin, jumlah penduduk, kawasan tinggi, jaringan pengangkutan, jaringan sungai dan sebagainya. Data-data ini boleh digembleng untuk mendapat satu hasil yang baik sebagai satu maklumat bagi menghadapi bencana tersebut.

Menyentuh isu sumber data untuk dibuat analisis dan kajian kemungkinan, suka saya mengambil kesempatan di sini untuk memaklumkan bahawa kewujudan Pusat Infrastruktur Data Geospatial Negara (MaCGDI), merupakan pemangkin kepada kajian kemungkinan tersebut. MaCGDI yang berperanan sebagai pusat perkongsian data Geospatial telah menyediakan satu infrastruktur yang boleh diakses secara internet bagi mendapatkan data-data yang berkaitan. Para pembuat keputusan, perancang dan pentadbir boleh mengambil manfaat hasil dari perkongsian data melalui *Malaysian Geospatial Data Infrastructure (MyGDI)* untuk membuat analisis bagi pencegahan banjir, penempatan mangsa banjir, pembinaan semula kawasan dan banyak lagi.

Akhir kata, dalam konteks penjagaan alam sekitar serta pengagihan sumber dengan cara yang bersepadu dan menyeluruh, kerjasama semua pihak sama ada kerajaan mahupun swasta serta orang perseorangan amat diperlukan dalam menangani masalah alam sekitar. Sudah menjadi kewajipan kita bagi memastikan alam sekitar yang bersih, sihat dan produktif serta mampu memenuhi keperluan dan aspirasi diri dan negara.

# Lawatan Kerja Y.B. Dato' Seri Azmi bin Khalid dan Delegasi Ke Map World Forum 2007, Hyderabad, India

Dr. Zainal bin A. Majeed
Pusat Infrastruktur Data Geospatial Negara (MaCGDI)
Kementerian Sumber Asli dan Alam Sekitar (NRE)

Y.B. Dato' Seri Azmi bin Khalid, Menteri Sumber Asli dan Alam Sekitar mengetuai delegasi Malaysia mengadakan lawatan kerja ke Map World Forum 2007, Hyderabad, India dan lawatan teknikal ke National Informatics Centre, New Delhi, India dari 19 hingga 26 Januari 2007. Antara agenda lawatan tersebut termasuklah:

i. Penyampaian ucap utama Y.B. Menteri sebagai tetamu kehormat pada 22 Januari 2007, dan menghadiri, plenari, seminar dan pameran di Map World Forum 2007;

ii. Perjumpaan dan perbincangan dengan Mr Kapil Sibal, Menteri Sains dan Teknologi dan Pembangunan Lautan India (*Minister for Science & Technology and Ocean Development of India*); dan

iii. Lawatan kerja ke *National Informatics Centre (NIC) of the Department of Information Technology*, New Delhi, India pada 25 Januari 2007.

Delegasi Malaysia yang diketuai oleh Y.B. Menteri Sumber Asli dan Alam Sekitar itu terdiri daripada Timbalan Ketua Setiausaha II Kementerian Sumber Asli dan Alam Sekitar (NRE), Tuan Haji Mohd Ibrahim bin Haji Abu Bakar, Timbalan Ketua Pengarah Ukur dan Pemetaan, Y.Bhg. Dato' Sr. Dr. Abdul Kadir bin Taib, Ketua Penolong Pengarah MaCGDI, Dr. Zainal bin A. Majeed dan seorang pegawai Menteri, Encik Hapdzan bin Husaini.

Kerajaan India telah mengundang Y.B. Menteri dan delegasinya untuk mengadakan lawatan dan menghadiri forum ini kerana kebanyakan sumber data yang digunakan dan disimpan di Jabatan dan Bahagian di bawah NRE mempunyai identiti dan unsur geografi, pemetaan dan lokasi. Teknologi, sistem, teknik penyediaan pangkalan data dan penyebaran data yang digunakan di Jabatan dan Bahagian berkenaan juga berkait rapat dengan penggunaan *GIS, GPS* dan *Remote Sensing*, terutamanya di Jabatan Ukur dan Pemetaan Malaysia (JUPEM) dan Pusat Infrastruktur Data Geospatial Negara atau MaCGDI.

## Map World Forum 2007

Map World Forum 2007 merupakan persidangan antarabangsa yang menggabungkan beberapa agensi dan organisasi bertaraf dunia yang bergiat hebat dalam teknologi *Geographic Information System (GIS), Global Positioning System (GPS)* dan *Remote Sensing*. Antara agensi dan organisasi antarabangsa berkenaan termasuklah *Open GIS Consortium (OGC), International Society of Photogrammetry and Remote Sensing (ISPRS), Federation of International Surveyors (FIG)* dan *International Cartographic Association (ICA)*. Persidangan ini merupakan platform kepada pelbagai komuniti bertaraf superlatif yang terlibat dengan penyediaan dan penggunaan maklumat geospatial mempamerkan, berinteraksi dan bertukar fikiran serta mempersembahkan aktiviti dan perlaksanaan *GIS, GPS* dan *Remote Sensing.*

Forum ini telah dihadiri oleh agensi-agensi awam serta swasta negara-negara berikut: Jerman, Netherland, India, Oman, Republik Czech, Amerika Syarikat, Denmark, Arab Saudi, Kanada, Jepun, Rusia, Thailand, Indonesia, New Zealand, Emiriyah Arab Bersatu, Austria, Afrika Selatan dan Australia. Aktiviti forum adalah kombinasi aktiviti-aktiviti seminar, bengkel, dan perbincangan panel yang menyentuh bidang-bidang teknologi, dasar dan tema yang berkaitan dengan penggunaannya di peringkat negeri, negara dan global. Di samping itu, persidangan ini juga menganjurkan aktiviti lain seperti Sesi Poster, Mesyuarat, Trek Teknologi, Program Sosial dan Pameran.

## Perjumpaan Menteri dengan Mr. Kapil Sibal

Dalam sesi perjumpaan dengan Menteri Sains & Teknologi dan Pembangunan Lautan India, Mr Kapil Sibal, beliau telah melahirkan rasa bangganya terhadap lawatan kerja dan ucap utama oleh Y.B. Menteri serta delegasi Malaysia. Dalam perjumpaan ini mereka telah membincangkan kerjasama dua hala mengenai teknologi geospatial dimana

masing-masing pihak mempunyai kepakaran yang boleh dimanfaatkan. Perbincangan juga meliputi cara-cara teknologi *GIS, GPS* dan *Remote Sensing* boleh dimanfaatkan bagi pengurusan sumber alam semula jadi dan alam sekitar. Mr Kapil Sibal telah mencadangkan supaya ditubuhkan sebuah kumpulan kerja untuk memulakan dan melaksanakan kerjasama ini yang merangkumi pembangunan *ICT, GIS, GPS* dan *Remote Sensing*. Lawatan teknikal ke Malaysia yang menjurus kepada latihan dan pembelajaran penggunaan teknologi terkini ke arah membangunkan pangkalan data geospatial dan pembinaan kapasiti NSDI boleh dimulakan oleh India. Pembangunan NSDI di India masih di peringkat permulaan, walhal proses penubuhan dan pembangunan NSDI di Malaysia telah dimulakan semenjak tahun 1997 lagi. Dengan ini, pengalaman Malaysia boleh menyumbang ke arah kebaikan pembangunan NSDI di India. Perbincangan Y.B. Menteri dengan Mr. Kapil Sibal adalah positif dan berkesan bagi pembangunan dan pelaksanaan *GIS, GPS* dan *Remote Sensing* di Malaysia apabila India boleh membekal teknologi dan ilmu pengetahuan teknikal dengan kos yang berpatutan.

*Perjumpaan dan perbincangan dua hala dengan Mr. Kapil Sibal*

## Ucap Utama dan Pembukaan Rasmi Persidangan

Sempena persidangan Map World Forum 2007, Kerajaan India telah mengundang Y.B. Menteri Sumber Asli dan Alam Sekitar secara rasminya untuk menyampaikan ucap utama di samping menghadiri persidangan dan mengadakan perjumpaan dengan Menteri Sains & Teknologi dan Pembangunan Lautan India, Mr. Kapil Sibal. Y.B. Menteri telah menyampaikan ucap utama sempena pembukaan persidangan pada pagi 22 Januari 2007. Ucapan beliau selama 20 minit telah menyentuh secara langsung mengenai perkara-perkara yang berkaitan dengan teknologi dan ICT yang ada hubungan langsung dengan kandungan Map World Forum 2007. Beliau juga menyentuh isu-isu semasa mengenai alam sekitar, pemanasan bumi (*global warming*), pengurusan sumber asli, perkembangan teknologi geospatial yang terkini dan kerjasama yang boleh diadakan tentang teknologi berkaitan dengan India. Dalam ucapan beliau, Y.B. Menteri memberitahu mengenai penggunaan teknologi yang termampu oleh kedua-dua negara bagi tujuan kerjasama dua hala yang lebih berkesan. Malaysia boleh memberi kerjasama dan sumbangan teknologi berkaitan yang termampu kepada India dan begitu juga India sebaliknya.

Ucapan Y.B. Menteri yang menyatakan keperihatinan Malaysia mengenai isu alam sekitar dan kerjasama dalam teknologi geospatial telah mendapat sambutan yang baik dari wartawan dan Kerajaan India. Teks ucapan beliau telah diedarkan kepada wartawan-wartawan yang membuat liputan di persidangan. Selepas itu, Y.B. Menteri juga telah diberi penghormatan untuk merasmikan bersama persidangan melalui upacara yang diadakan di hadapan seramai lebih seribu para hadirin dari seluruh dunia. Beliau juga diberi penghormatan merasmikan Pameran *GIS, GPS* dan *Remote Sensing* di ruang Dewan Pameran bersama Menteri Sains & Teknologi dan Pembangunan Lautan India, Mr. Kapil Sibal.

*Perasmian pameran oleh Mr. Kapil Sibal dan Y.B. Dato' Seri Azmi bin Khalid.*

Dalam Sidang Media yang diadakan bersama Mr. Kapil Sibal, Y.B. Menteri telah ditanya mengenai isu pembakaran hutan yang mengakibatkan jerebu di Malaysia dan langkah-langkah serta teknologi geospatial yang digunakan untuk mengatasinya. Beliau telah memberitahu mereka bahawa melalui persidangan ini, adalah diharapkan beberapa inovasi ke arah menentukan '*hotspot*' yang sebenarnya di muka bumi kawasan pembakaran boleh dicapai. Ucap utama dan kehadiran Y.B. Menteri telah mendapat liputan sebuah akbar tempatan India '*The Hindus*'.

## Aktiviti Forum

Dari 22 hingga 25 Januari 2007, delegasi Malaysia telah menghadiri beberapa sesi plenari, seminar dan sesi poster. Sesi-sesi ini telah memberi banyak faedah dari segi pendedahan kepada pembangunan dan perancangan terkini teknologi geospatial oleh pakar-pakar dari negara membangun dan negara maju. India sendiri mempunyai pakar IT dan GIS yang cemerlang di sektor awam dan juga sektor swasta. Beberapa pembentang plenari dari USA, Austria, Netherland, United Kingdom dan Denmark telah mempersembahkan pengalaman dan kajian kes yang baik untuk diikuti oleh para peserta forum. Sesi plenari telah mempamerkan pengalaman dan kesungguhan profesional dan pakar yang telah bergiat lama dalam penyelidikan dan pembangunan dalam bidang *GPS, GIS* dan *Remote Sensing* dan organisasi yang berjaya mempeloporinya. Antara pakar-pakar itu ialah Prof. Stig Enemark (Denmark), Peter Holland (Australia), Prof. Bas Kok (Netherland), Prof. Josef Strobl (Austria) dan President ESRI (USA), Jack Dangermond.


Kebanyakan kandungan sesi persidangan mempunyai kaitan rapat dengan bidang utama yang dijalankan oleh JUPEM dan MaCGDI, dan juga Jabatan di bawah NRE yang mempunyai Unit atau Seksyen GIS, seperti di Jabatan Alam Sekitar Malaysia. Pegawai berkenaan yang hadir diyakini boleh meningkatkan keupayaan mereka dengan mengambil ikhtibar dan pengalaman idea dan kajian kes yang dibentangkan. Di samping itu, perhubungan yang baru dapat diwujudkan dengan pakar-pakar terkemuka dunia untuk rujukan serta khidmat nasihat bagi usaha seterusnya.

Sebanyak 23 tema telah dipersembahkan oleh pembentang-pembentang kertas kerja dalam seminar dan sesi teknikal. Antara tema yang menjadi sesuai dan berkaitan bagi delegasi Y.B. Menteri ialah *disaster management, spatial database infrastructure, standards and interoperability, forestry and remote sensing, surveying and mapping, natural resources and ecology monitoring dan Web GIS*. Timbalan Ketua Pengarah Ukur dan Pemetaan Malaysia (TKPUP), Y.Bhg. Dato' Sr. Dr. Abdul Kadir bin Taib telah dijemput untuk membentangkan satu kertas kerja pada sesi seminar yang bertajuk Surveying and Mapping. Oleh sebab sesi persembahan diadakan secara selari di Bilik Dewan yang berasingan, para delegasi Malaysia telah dibahagikan mengikut kesesuaian dan topik yang berkaitan untuk menghadiri sesi agar semua persembahan kertas berkenaan dapat dimanfaatkan. Banyak pengalaman dan ilmu serta inovasi yang dipamerkan boleh digunakan sebagai ukuran dan penyelidikan untuk faedah dan kebaikan pengurusan, perancangan dan pembangunan Kementerian secara keseluruhannya.

## Lawatan Teknikal ke NIC

Satu lawatan ke *National Informatics Centre (NIC), Department of Information Technology, Ministry of Communication and Information Technology* India telah diadakan pada 25 Januari 2007. Kedatangan delegasi Malaysia telah disambut oleh Timbalan Ketua Pengarah NIC, Dr. Mahesh Chandra di pejabat beliau. Dr. Mahesh telah menerangkan profil dan organisasi NIC secara ringkas. Isu pembangunan pangkalan data GIS untuk menyimpan segala maklumat di agensi Kerajaan dibincangkan.

Kemudiannya delegasi Malaysia telah dibawa melihat secara dekat aplikasi dan pembangunan GIS serta pangkalan data geospatial yang dibangunkan di beberapa seksyen di NIC. Lawatan ini telah memberikan pengalaman dan pendedahan yang berkesan kepada cara-cara data spatial dan bukan-spatial (*textual*) disimpan dan diuruskan dalam pangkalan data geografi atau geodatabase menggunakan teknologi dan perisian GIS terkini dari AS. Sistem rangkaian yang diwujudkan merangkumi semua agensi Kerajaan bagi menguruskan pemantauan aplikasi dan sistem yang dibangunkan di setiap agensi di

lokasi yang berbeza. Bagi Malaysia, pihak MaCGDI sedang menguruskan penubuhan pangkalan data yang sama fungsinya yang dinamakan National Geospatial Data Centre (NGDC), tetapi masih dalam peringkat awal lagi untuk direalisasi sepenuhnya. Antara isu yang belum diselesaikan ialah dasar perkongsian data kebangsaan yang perlu digubal.

*Tuan Haji Mohd Ibrahim bin Haji Abu Bakar (TKSU II) bersama dengan Timbalan Ketua Pengarah NIC di pejabat NIC.*

Pihak NIC telah menggubal sebuah dokumen Kerajaan 'Dasar Pemetaan Kebangsaan' sejak enam (6) bulan yang lalu. Dasar ini merangkumi perkara-perkara mengenai perundangan perkongsian data dan integrasi data di kalangan agensi-agensi Kerajaan India. Malaysia masih belum mempunyai 'Dasar Pemetaan atau Geoinformasi Negara'. Di NIC, jaringan tidak menjadi masalah dalam penyebaran data geospatial ke agensi-agensi Kerajaan kerana talian Internet untuk mencapai data-data geospatial secara dalam talian amat baik sekali, tidak seperti yang dihadapi oleh MaCGDI melalui pembekal sedia ada. Di Malaysia, penggubalan dasar atau kertas Kabinet yang menyeluruh diperlukan untuk memastikan satu dasar perkongsian data yang tulen dan berwibawa dapat digunakan dengan berkesan.

## Faedah dan syor-syor

Geospatial Data Centre (GDC) di peringkat nasional amat diperlukan untuk memastikan data disimpan dan diuruskan untuk kegunaan agensi Kerajaan. Oleh sebab usaha ke arah ini menghadapi masalah ketika ini, adalah dicadangkan satu prototaip aplikasi dan pangkalan data ini dibangunkan bagi menyimpan dan menguruskan data-data agensi di bawah NRE. MaCGDI telah mempunyai cadangan ke arah usaha ini tetapi menghadapi beberapa masalah termasuk keperluan suatu dasar kebangsaan yang menyeluruh mengenai geoinformasi (*geoinformation*) dan hal-ehwal pemetaan (*mapping matter*), isu perkongsian data, siapakah pihak penjaga tunggal (*sole custodian*) bagi GDC ini, tahap penggunaan agensi-agensi di peringkat persekutuan, negeri dan PBT, dan kesediaan agensi pembekal data untuk menyertai GDC ini. Sebagai permulaan, penggubalan 'Dasar Pemetaan/Geoinformasi Kebangsaan' adalah kritikal supaya pematuhan yang menyeluruh dapat memastikan kejayaan GDC ini. MaCGDI adalah agensi yang boleh dipertanggungjawabkan untuk memainkan peranan awal dalam hal ini. Oleh itu, isu perkongsian data akan dibawa kepada perhatian Kabinet secara berasingan ke arah dasar yang lebih jelas supaya undang-undang/peraturan yang mantap mengenai GIS dapat disediakan untuk negara.

Keperluan memastikan data mempunyai kualiti yang baik juga merupakan isu kritikal supaya data dan pangkalan data mempunyai integriti untuk dikongsi dan digunakan oleh banyak agensi. Dengan kewibawaan data ini, ia amat sesuai untuk kegunaan seperti pengurusan bencana, pengurusan alam sekitar dan amaran kecemasan. Satu garis panduan di peringkat kebangsaan diperlukan bagi memastikan data yang digunakan untuk jentera pentadbiran Kerajaan mencapai tahap ketepatan yang tinggi serta terkini, dapat diwujudkan.

Aplikasi GIS telah terbukti amat diperlukan oleh kebanyakan agensi Kerajaan terutama di bawah NRE bagi isu-isu yang berkaitan dengan perhutanan, pengurusan banjir, alam sekitar, perlombongan, perhilitan dan sumber asli lain. Dari pengalaman Map World Forum, GIS dan Remote Sensing merupakan penyelesaian yang terbaik bagi perancangan dan pembangunan sesebuah negara dalam era ICT dan globalisasi. Sudah tiba masanya semua agensi menggunakan GIS untuk pemantauan, pengurusan, penguatkuasaan, penyelidikan, perancangan dan pengambilan keputusan. Sebagai permulaan, arahan yang mantap dari NRE boleh dibuat agar Jabatan Alam Sekitar sendiri menunjukkan aplikasi GIS yang boleh dimanfaatkan.

Integrasi data dan standardisasi adalah isu penting yang perlu digemblengkan oleh agensi seperti Jabatan Standard, JUPEM dan MaCGDI dan juga semua agensi di bawah NRE. Teknologi GPS, GIS dan Remote Sensing serta kebolehan ICT boleh digunakan untuk menggabungkan semua data geospatial yang ada di agensi Kerajaan. NGDC boleh digunakan sebagai landasan awal untuk menggabungkan data geospatial melalui Internet. MaCGDI merupakan ahli Pertubuhan Standard Antarabangsa (*International Standard Organisation*) yang bersidang setiap tahun. Pembangunan standard bagi geospatial data merupakan aktiviti yang berterusan. MaCGDI dan JUPEM adalah Jabatan yang memainkan peranan penting dalam menguruskan standardisasi data geospatial.

Pembangunan keupayaan modal insan bagi National Spatial Data Infrastructure (NSDI), seperti Malaysian Geospatial Data Infrastructure atau MyGDI yang dibangunkan oleh MaCGDI adalah penting. Ini termasuk pembangunan sumber manusia, kekuatan institusi, teknologi, kepakaran dan keupayaan kewangan yang merupakan sebahagian dari proses pembangunan keupayaan modal insan yang dimaksudkan. Latihan praktikal secara praktikal dan acara kesedaran terhadap GIS boleh mewujudkan komuniti GIS yang pakar. Majlis-majlis seperti Hari GIS atau Minggu GIS boleh diadakan di Kementerian apabila semua agensi boleh menunjukkan sistem GIS masing-masing. Pameran dan persembahan teknikal mengenai GIS untuk murid-murid sekolah juga boleh diadakan bagi memberi pendedahan awal kepada golongan rendah dan belasan tahun.

Melalui persidangan ini, antara faedah-faedah yang telah dicapai adalah seperti yang berikut:

i. Mendapat pendedahan yang meluas berkaitan dengan teknologi geospatial terkini dan perkembangan aplikasi GIS serta GPS dan Remote Sensing;

ii. Dapat menimba ilmu dan mendapat ikhtibar melalui pengalaman-pengalaman serta maklumat pembentangan kajian kes yang boleh dijadikan sumber rujukan;

iii. Dapat meningkatkan jaringan di peringkat antarabangsa antara negara-negara maju dan membangun sambil dapat bertemu dan berinteraksi secara langsung dengan pengguna-pengguna aplikasi GIS dan pakar dari serata dunia;

iv. Perkongsian pengalaman menggunakan aplikasi teknologi geospatial di beberapa peringkat pengurusan bencana, penjagaan alam sekitar dan pengurusan sumber asli serta berpeluang didedahkan kepada kaedah praktikal terbaik untuk mengawal bencana, penjagaan alam sekitar yang lestari dan pengurusan sumber asli yang moden dan canggih; dan

v. Mencetuskan idea/cadangan penambahbaikan praktikal untuk meningkatkan infrastruktur pangkalan data spatial dalam organisasi dan negara sendiri.

## Penutup

Adalah diharapkan pembangunan sistem GIS di Malaysia akan berhasil membawa perubahan yang berjaya mempertingkat pengurusan perkhidmatan awam secara berkesan. Sistem GIS mampu memacu Malaysia dalam era ICT dan globalisasi untuk mencapai taraf negara-negara maju seawal mungkin. Malaysia, sebagai bakal menjadi negara maju seharusnya memanfaatkan teknologi terkini seperti GIS, GPS dan Remote Sensing. Faedah yang dicapai boleh menjana ilmu dan teknologi terkini kepada pengurusan agensi Kerajaan yang akhirnya boleh membantu dalam merangka dasar Negara dan program yang baik dan cemerlang.
Adalah satu keperluan mendesak untuk Malaysia mengwujudkan mekanisma yang lebih bersepadu serta bersinergi bagi memantapkan pembangunan dan pengurusan data dan informasi negara. Teknologi GIS, GPS dan Remote Sensing digabungkan dengan ICT diyakini memberi pulangan yang baik.

Persidangan antarabangsa Map Asia 2007 yang akan diadakan pada bulan Ogos 2007 di Kuala Lumpur City Centre (KLCC), Kuala Lumpur merupakan susulan dan kesinambungan dari hasil lawatan kerja ke Hyderabad. NRE akan menjadi penaung dan penganjur persidangan antarabangsa ini.

**Info**

Maklumat lanjut berkaitan Map Asia 2002-2007 boleh di akses melalui *www.mapasia.org*

# Development Of Flood Risk Map For Sg. Selangor Basin

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*Abstract*

*Flood is a natural disaster in this country. Flood behaviour must well be understood before a proper measure can be taken for its mitigation. At present, one of the ways to study and understand flood behaviours is by generating flood risk maps. Hydraulic modelling using a computer model is required in order to carry out flood simulation to produce flood levels at various locations along the river and flood plain. However, to analyse a river system requires voluminous amount of data such as rainfall distributions, river properties and most importantly the flood plain topography. GIS software is able to handle the processing problems as an input to the hydraulic model. The output of the hydraulic simulation can be transferred to GIS software to generate flood layers for various scenarios. Further analysis such as flood damage assessment can be carried out for planning and design purposes. This in turn would be suitable for a decision support system.*

*This paper presents the various processes carried out using GIS tool to develop hydrological and, hydrodynamic models, 3D ground model and the generation of flood risk map.*

## Introduction

Malaysia experiences two types of flood namely the monsoon and flash floods. The monsoon flood occurs mainly during Northeast Monsoon which prevails from the months of November to March with heavy rains to the east coast states of the Peninsula, northern part of Sabah and southern part of Sarawak. Some of the recorded flood experiences in the country occurred in 1926, 1931, 1947, 1954, 1957, 1963, 1965, 1967, 1969, 1971, 1973, 1983, 1988, 1993, 1998 and 2001. The report from the Department of Irrigation and Drainage (DID) stated that about 29,000 sq. km or 9% of the total land area and more than 4.82 million people (22%) are affected by flooding annually. Damage caused by floods is estimated to be about RM915 million. The flood prone areas are shown in Figure 1. Monsoon flood is governed by heavy and long duration of rainfall that covers a large area. The flood from 2-6 October, 2003 affected a large area in the north-western part of the Peninsula covering the states of Kedah, Pulau Pinang and Northern Perak. The recent December flood badly damaged the southern part of Peninsula Malaysia involving the states of Melaka and Johor. Flash flood normally occurs quite rapidly such as the case of the two events occurring in April and October 2002 in Kuala Lumpur which has been recognized due to uncontrolled development and activities within the catchments and flood plains. At present the development of a flood risk map is a difficult process since the information from hydraulic analyses is needed to be exported and combined with the flood plain i.e. ground data. Therefore the use of GIS in processing raw data and combined with the hydraulic analyses to delineate flood extent shall be demonstrated in this paper.

## Objective of the study

- The main purpose of the study is to develop a complete river model consisting of hydrological, hydraulic, 3D ground model including various GIS layers covering the main river system and flood plain.
- The model will generate a flood risk map based on various return periods and provide quick results on flood impact due to probable human activities within a catchments area.

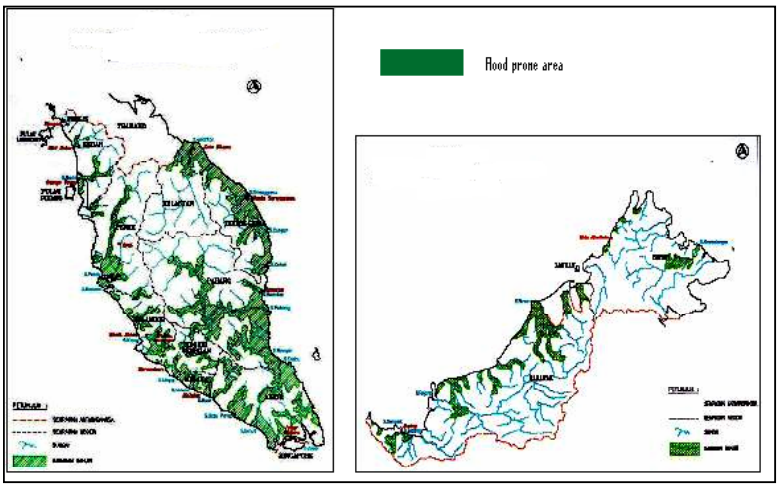



*Figure 1 : Flood Prone Areas in Malaysia*

## Study Area

Sg. Selangor is located at the northern part of the state of Selangor (Figure 2). The catchment is approximately 1960km2 which covers about a quarter of the area of the state of Selangor. The main river, Sg. Selangor starts from the west of the Titiwangsa Range at an elevation of approximately 1700m between the borders of the states of Selangor and Pahang. It flows approximately 110km towards the southwest to the Straits Of Melaka. The major tributaries are Sg. Kerling, Sg. Kubu, Sg. Rening, Sg. Batang Kali, Sg. Buloh, and Sg. Sembah as shown in Figure 3. To the east of the basin is a mountainous area which is mainly covered with forest and plantations while the west side is generally swampy and flat with paddy as the main agriculture activity. The most recent land-use map for the catchments is shown in Figure 4. Sg. Selangor was selected for this study because of the availability of the river survey data together with the ground elevation of the flood plain within 500m to 2km on each side of the river. Concurrently, due to its location, it is a potential area to be developed since the adjacent Klang Valley development is almost reaching a saturation level in the near future.

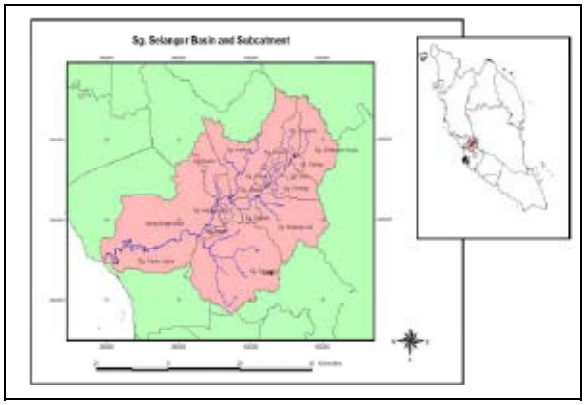



*Figure 2 : Study Area*

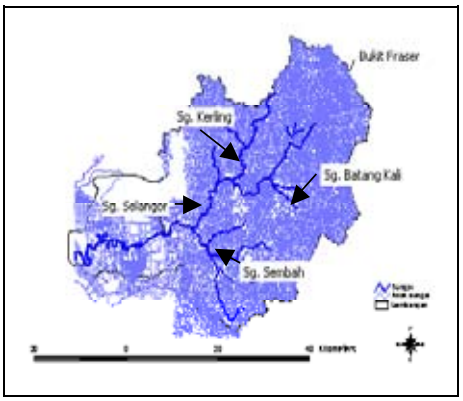



*Figure 3 : River System*

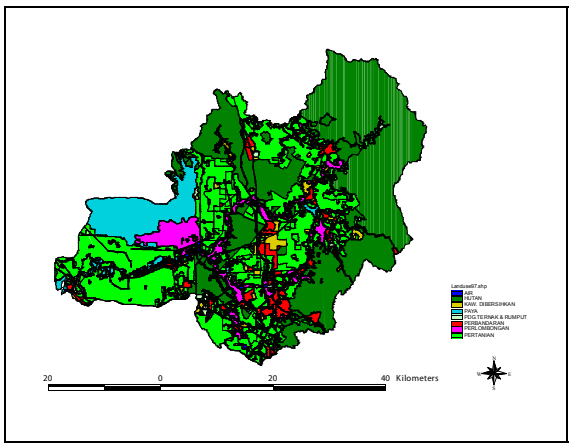



*Figure 4 : Landuse map (Source-DOA)*

## Flood risk map development

The process to delineate the flood extent consists of 3 main components, namely, hydrologic rainfall-runoff model, hydrodynamic model and 3D ground model. The process and data input for all the processes are shown in Figure 5. The main softwares used in the study are InfoWorks RS (River Simulation) for Hydrologic and Hydaulic modelling while Arc View + 3D Analyst and Surfer 8.0 are for the development of various layers and 3D ground model. InfoWorks RS combines water level from the hydraulic computation with the 3D (Shapefile) to produce the extent of flooding. The river model covers 110 km by cross sections at 1km apart and which begins at the new 'SPLASH' dam down to the river mouth covering the flood plain.

## GIS application

Due to the large amount of data being required for the input to the hydrologic and hydraulic models, most of the processes were carried out by using GIS software namely, Arcview 3.1 and 3D Analyst. The processes are :

- delineate the subcatchment boundary
- transform point rainfall to areal rainfall
- distribute the areal rainfall to subcatchment rainfall
- estimating land-use and soil type for subcatchment
- generate 3D ground model from contour and spot height
- generate flood extent
- estimate flood damage

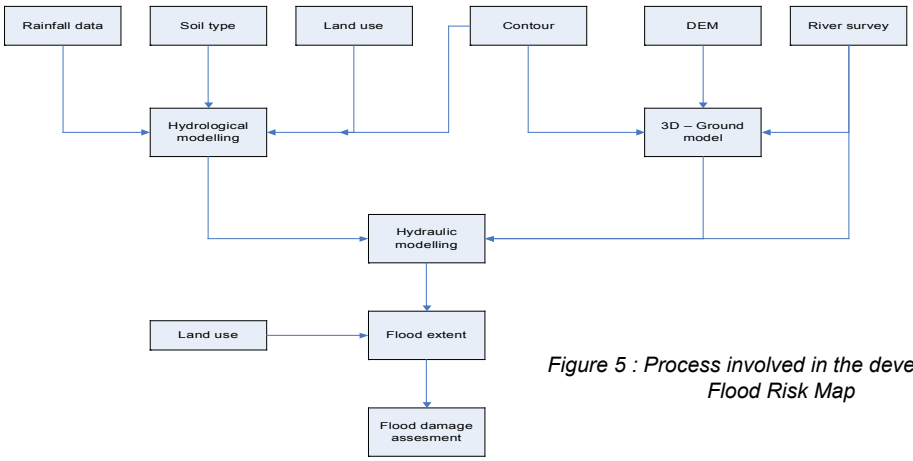



*Figure 5 : Process involved in the development of Flood Risk Map*

***Data collection***

The main factor to ensure that the study is successful is the availability of information and data. Tremendous effort was employed to process all important data. The table below listed the most critical information required for the analysis.

| Type | Source | Scale |
|---|---|---|
| **Hydrological data** | | |
| Rainfall data | DID | 1:50,000 |
| Land use data | DOA | 1:50000 |
| Soil type data | DOA | 1:500000 |
| | | |
| **Hydraulic data** | | |
| River cross section | DID | 1:2000 |
| | | |
| **Ground data** | | |
| 3-D flood plain terrain data | DID | 1:5000 |
| Contour | JUPEM | 1:25,000 |
| | | |

*Table 1 : List of most critical information in the catchments*

Note

DID - Department of Irrigation and Drainage

DOA - Department of Agriculture

JUPEM - Department of Survey and Mapping Malaysia

***Rainfall runoff modelling***

The main inputs to the rainfall runoff model are the subcatchment area, river gradient, land-use, soil type and rainfall distribution. Most of this data can be extracted from JUPEM topographical map, DID hydrological station and the Department of Agriculture (DOA). Various GIS analyses were carried out to determine the information that is illustrated below.

***Division of subcatchment***

Various methods to delineate the subcatchment are available but for this exercise the subcatchment boundary was digitized manually from the contour and river layers using ArcView. This manual process was selected because the contour interval of 20m does not provide a good representation for the downstream part of the basin which is very flat. The division of subcatchment is shown in Figure 5.

***River slope***

The river slope was estimated by using a simple approach which is the difference of height divided by the length of the river. Both of this information is available form the contour and river layers.

***Soil distribution***

The rainfall runoff model (SCS Method) requires the soil group to be defined by the Curve No (CN) for each subcatchment. Value for CN base on land-use is available from many references. This information was then combined to the Land-use layer using Join Table technique. Overlaying process using 'Union' was carried out to distribute the soil group to various subcatchment to calculate the average CN for each subcatchment.

***Rainfall area distribution***

A rainfall runoff model requires an areal rainfall data. However DID only provides point rainfall from hydrological stations within the basin. Thiessen polygon technique was used to convert the point rainfall to areal rainfall. It is then redistributed to the various subcatchment using the overlay process. Thiessen's Polygon map is shown in Figures 7 and 8.

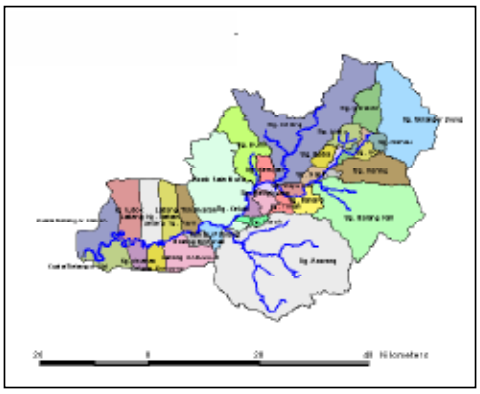


*Figure 5 : Division of subcatchment*

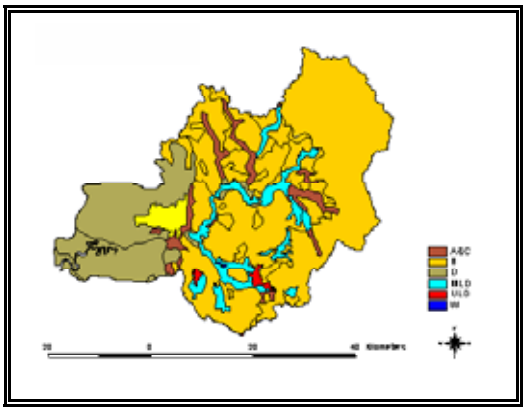


*Figure 6 : Soil hydrological classification*

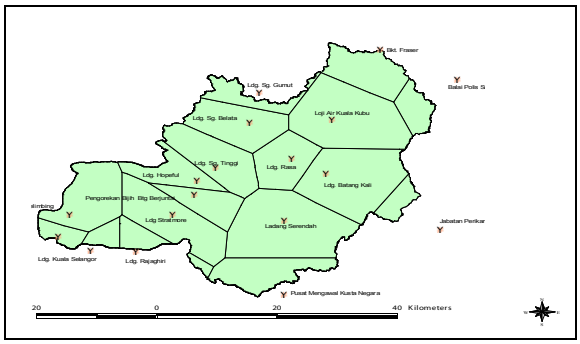


*Figure 7 : Tranforming point rainfall to areal rainfall (Thiessen's Polygon)*

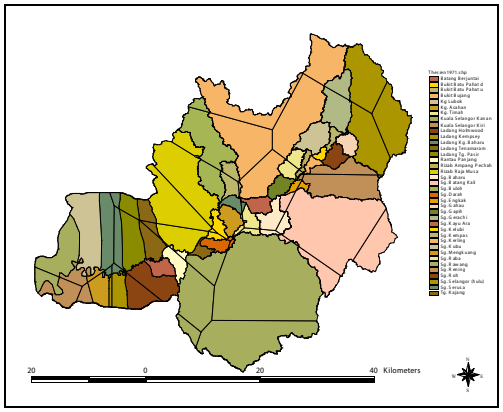


*Figure 8 : Overlaying areal rainfall with subcatchment*

### *River cross section*

The main inputs for the hydraulic model are the river cross section and flood plain. The cross section survey was done at 1km interval which extends up to 1km on each side of the river bank. Therefore about 100 cross sections were required for the data input involving the coordinate longitude latitude and the ground value. Experience shows that by using the manual input, the process would need about 2 months to complete. The cross section data which is available in 3D point in AutoCad were converted to 3D ground model using ArcView 3D Analyst and development of the river hydrodynamic model was completed within one week. The model is shown in Figure 9 and Figure 10.

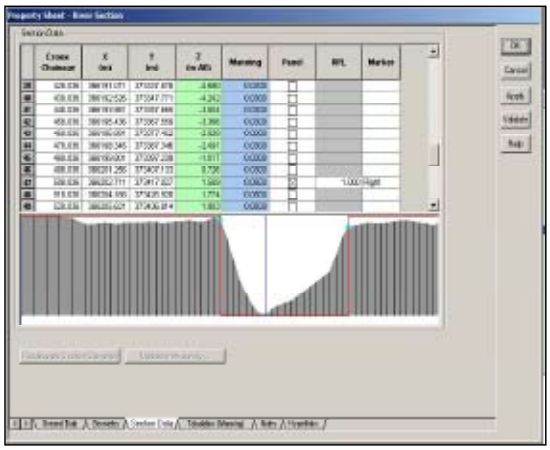


*Figure 9 : Sample river cross section in the hydraulic model*

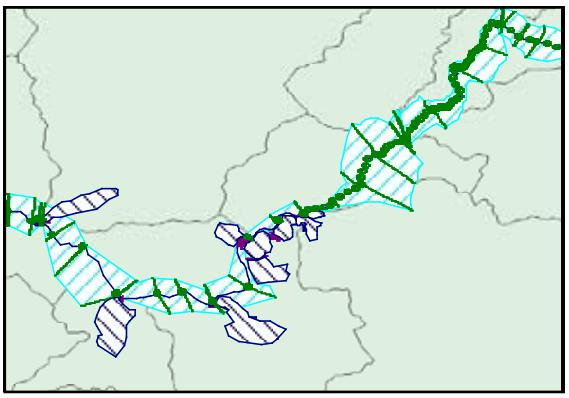


*Figure 10 : Part of river hydraulic model in t he river network*

### *Ground model development*

InfoWorks RS combines the hydraulic model and the ground model during the hydraulic simulation process to delineate the flood extent. The quality and accuracy of the flood extent depend on the quality of the ground

model. The ground model was developed from the contour map, the survey data and spot height in the flood plain. The contour interval from JUPEM is at 20m interval while the survey contour was at 5m interval. Spot height is available in the flood plain at a spacing of 200m. The bed level along the centre line of the river was extracted from the cross-section survey. Elevation of infrastructures such as road and bund in the flood plain are partly available and treated as a hard break line in ArcView 3D Analyst during the triangulation process. The information above, especially the contour can be considered good for the upstream steep stretch but does not produce a good 3D ground model at the lower part of the river system where the flood plain is flatter and consist many infrastructures such as roads and bunds. The ground model was further improved by using the Kriging method in Surfer 8.0 which produces grids at 10 – 30 m spacing. The final ground model for the whole river system is about 700 Mbyte and which consumes a high percentage of memory and thus slowing the simulation time. For the purpose of the study, only the middle part of the river system that contained about 200 Mbyte was used. The 3D TIN was then exported to 3D shp file using TIN exporter to InfoWorks RS. The ground model in InfoWorks RS is shown in Figure 11 and Figure 12.

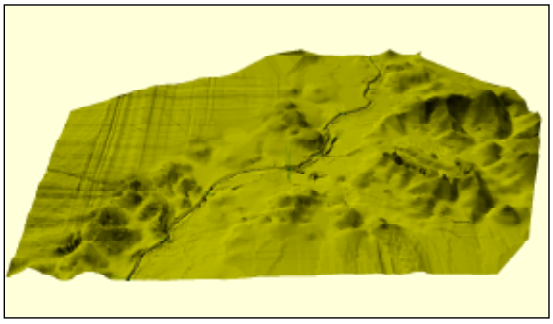


*Figure 11 : 3D ground model generated using 3D Analyst and Surfer*

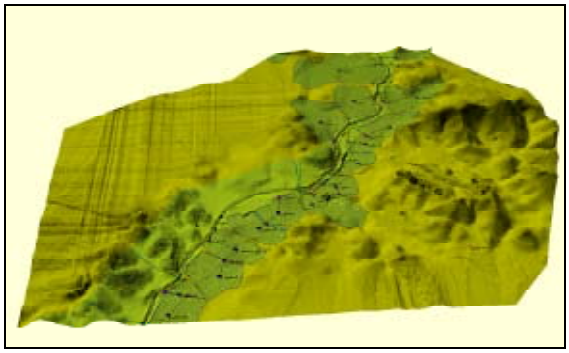


*Figure 12 : Combination of hydraulic model and 3D ground model*

## Simulation and generation of flood map

Simulations using storm of 1:100 ARI was carried out to reduce to flood extent which then was exported to ArcView. Flood depth at various locations are shown in Figure 13. Using the overlay process between the flood map and land-use, flood damage assessment is easily done as shown in Figure 14. The flood extent changes at various time can also be produced to help in understanding the pattern of flood movement in the flood plain (Figure 15).

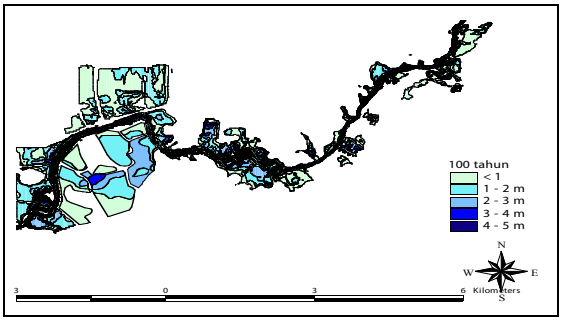



*Figure 13 : Flood depth along the river*

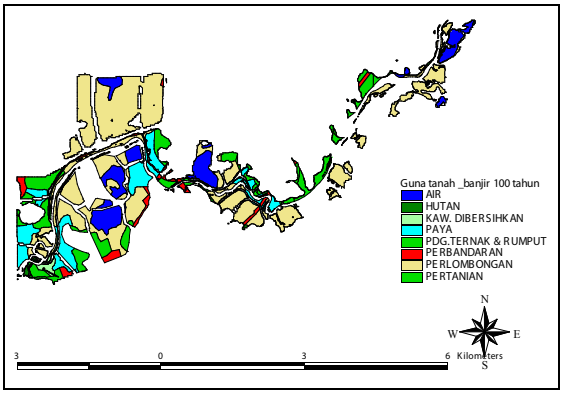
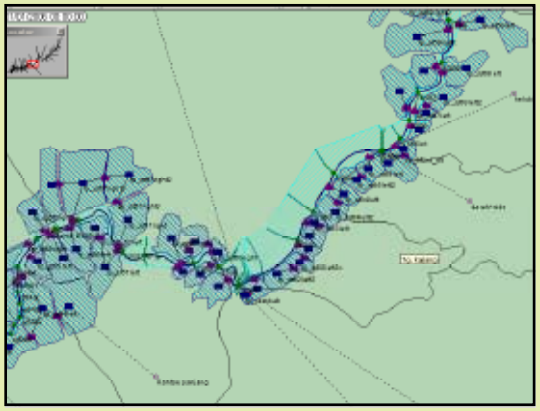
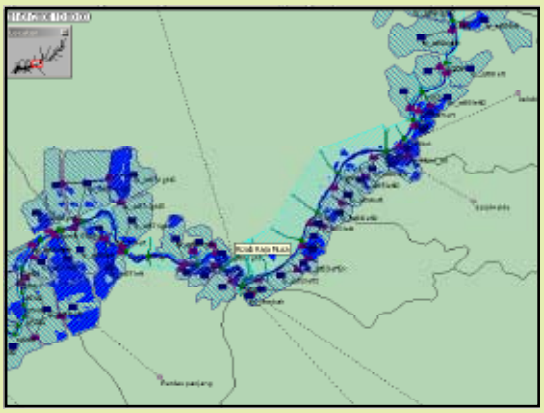



*Figure 14 : Flood inundation area based on land-use.*

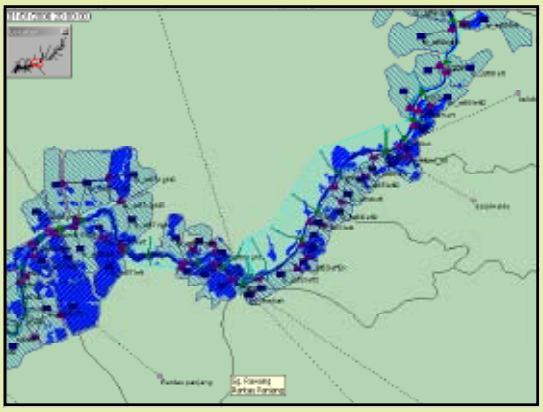
*"Flood is a natural disaster in this country. Flood behaviour must well be understood before a proper measure can be taken for its mitigation. At present, one of the ways to study and understand flood behaviours is by generating flood risk maps. Hydraulic modelling using a computer model is required in order to carry out flood simulation to produce flood levels at various locations along the river and flood plain"*



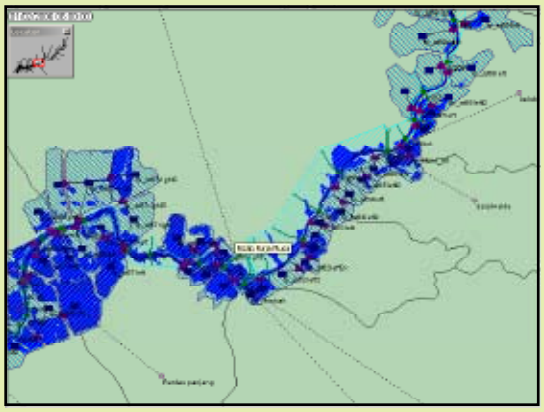
Start – 0 hour



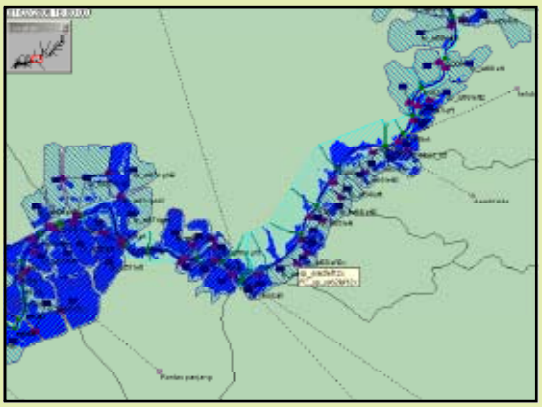
After –10 hours



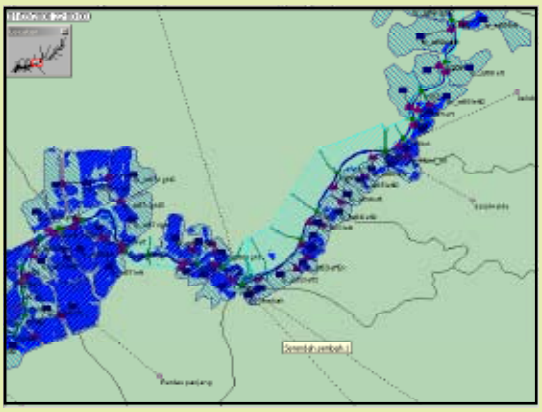
After 20 hours



After 30 hours



After 40 hours



After 60 hours

*Figure 15 : Flood movement along the flood plain varies with time*

## Conclusion

The study has demonstrated that the flood map delineation for a big river system can be achieved in a short time with the support of GIS tools. The processes of overlaying layer help to reduce the effort of processing data for hydrological, hydraulic and ground model. The quality of the flood extent depends to a large extent on the quality of the ground model that requires a proper triangulation process. In the future, easy production of flood risk map will enhance the planning of flood management in the country.

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## Are GIS data accurate?

GIS data are not accurate when compared to what land surveyors observe and record in the field. Issue on quality and coverage of the source data makes the GIS-ready information in dilemma. An analysis of the quality and coverage of possible sources is required because a particular GIS feature is often shown on multiple sources of varying quality. In actual fact, the quality of source materials should be equal to or greater than the desired quality of the converted database; otherwise the source can be rejected and replaced. For example, if maps do not show the required information with appropriate accuracy, precise calculations or aerial mapping may have to be used to provide the data. Therefore it is crucial to identify the accuracy of sources before defining them in database and before the cost of conversion is estimated and quoted and data conversion begun. It is also important that GIS-ready information should explicitly and accurately refer to the source documents from which they were compiled. Such linkage could be achieved by carrying a source document identifier in the database record of each GIS feature, or linking to scanned images of those source documents. As such, in spatial data infrastructure this should not be isolated because users starving for data not just need data but current and accurate data readily available to contribute, locally, nationally and globally to economic growth, environmental quality and stability, and social progress.

Framework Data Development and Implementation Section 1 (FWI), MaCGDI

# The Establishment of Kariah Boundary Using GIS

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Norshahrizan bin Mohd Hashim,
Integrated Agro-Technology and Research Management (IATREM), UiTM Perlis.

*Abstract*
*Kariah or mosque based community boundary identification has become a crucial and sensitive rights issue. The boundaries define the rights, onus, power and services of the people especially for the Muslim community. The boundaries are normally alienated according to the mosque capacity of congregation, population borders and leader's intuitive. However with the highly demanded community efficiency management, land-use optimization, population handling and land value appreciation, the situation is getting tense, vague and causes a great deal of confusion in the kariah's right. This project is undertaken to include more sustainable parameters in the boundary of the kariah. The study was based on one of the kariah boundaries in Perlis, Malaysia. GIS techniques (ArcGIS) of overlaying, reclassification according to Thiessen principle, Neighbourhood, Network analysis and Matching area have been used in the analysis. The result shows various structures of boundaries in different polygonal shapes where each shape is analysed with respect to the named parameter. The research revealed that none of the techniques was able to give the optimum result for all parameters but the best boundary has been suggested.*

## INTRODUCTION

Mosque is a place of worship for Muslims. In addition the mosque also acts as an administrative centre for the Muslim community, civilization and hence, the centre of attraction. A mosque's boundary is a subset of an administrative boundary. There are about 99 mosques in Perlis which are sanctioned by the State Religious Department. Every mosque has its own county, known as the kariah boundary. Kariah boundary means a limited area of jurisdiction of a particular mosque. According to Shuib Daud (2003), the boundary has a great impact on the mosque management especially in relation to worship, social interaction and syariah legal issues.

From the theoretical point of view, the boundaries can be viewed as a hierarchy division of an area (Gunnar Thorvaldsen, 1997). A country is divided into several states. The states are divided into several districts or provinces and which are in turn divided again into smaller entities known as mukims, municipalities etc.

There are several rules or criteria set by certain authorities to establish administrative boundaries. Initially, the boundaries to a large extent, followed the topographical divisions such as rivers, mountain ranges etc. Eventually, it became more common to use the greater range of functional criteria such as communication, infrastructure, social and cultural divisions.

However the implementation process for the time being is time consuming, hardly integrated information and is a tedious task. This research is to investigate a new approach in order to facilitate the implementation of a spatially based boundary where GIS is used. GIS or Geographical Information System has become a useful tool for any related spatially data based management which can integrate data from various platforms, which becomes an effective information for decision making (Zakaria Mat Arof, 2002). In this paper, this technique has been used to analyze various spatial elements contributing to the new establishment of Muhammadiah Mosques kariah boundary.

The study area is located in the region of Arau in Perlis (Figure 1). In general, the kariah boundaries around Arau were assigned in a sub-structured manner where each kariah was established mainly based on general understanding among the respective stakeholders (Shuib Daud, 2003).

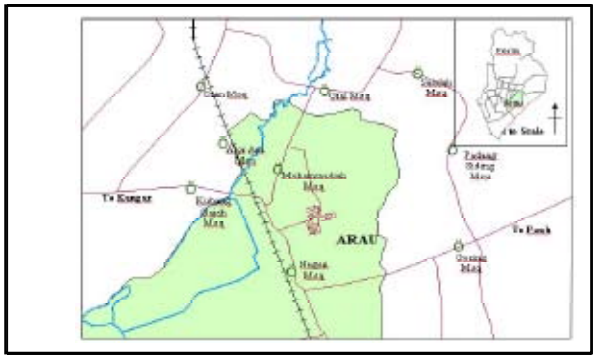



*Figure 1 : Study Area*

## BACKGROUND STUDY

A set of rules or criteria were discussed in many pieces of work by different authors and organizations such as JUPEM, 2005; Eagleson et al., 1999, 2003; Gunnar Thorvaldsen, 1997; Anna Katz, 2004; and Gian Gandi et al., 2004.

Department of Survey and Mapping, Malaysia (JUPEM) for example, administers boundaries within Malaysia that separate nations, states, local government and individual right. The boundary is determine basically according to the physical barriers such as thalweg (river), watershed, hill and many other types of allocation right.

In the earlier study by Eagleson et al. (1999, 2003) it shows that an administrative boundary determined for a rural area depends largely on population density, catchments areas, roads network and natural barriers. While the study for the metropolitan area, shows that topographic barriers, road network and circularity index are the criteria's priority.

Meanwhile according to Anna Katz (2004), based on the case study of delimiting of electoral boundaries, the most widely accepted rule for redistricting the boundary should be relatively equal in population. In this study, Anna Katz specifies that geographic elements or certain geographic factors have to be taken into account in the process of delimiting electoral district lines. The author divided the geographic factors as geographic boundaries and geographic size or shape. In the mean time Gunnar Thorvaldsen (1997) combined physical boundaries, communication, infrastructure, social and cultural division as the main criteria to define local historic boundaries in Norway.

Similarly, there are also many approaches that have been adopted in the process of boundary determination. In the case of Eagleson et al. (2003) a prototype consisting of cost-distance allocation, road proximity boundaries and boundary alignment methods within GIS environment have been developed. Four conceptual models in the environment were also examined.-Table 1. They found that, combination of number 2 and 3 model where thematic map and spatial selection techniques were involved was the most appropriate method for boundary determination in a metropolitan region.

## METHODOLOGY

This study was based on the research and development approach where the existing boundary determinations were studied and the alternative boundary was proposed. Four basic models have been used to test various approaches in generating the best kariah boundary for the Muhammadiah Mosques. The overall methodology adopted is given in Figure 2 and is segregated into three difference stages.

| Model | Description |
|---|---|
| 1 | Interactive boundary delineation |
| 2 | Thematic selection |
| 3 | Spatial selection using Thiessen polygon |
| 4 | Thiessen selection based on the existing boundaries |

*Table 1 : Conceptual Model of Administrative Boundary Determination*

The first stage is problem identification. The objectives of this stage are to investigate and revise the current method and criteria used by various organizations particularly the Perlis religious authority for boundary determination. It was conducted through interviews, discussions and by reviewing documents. The following are the criteria adopted.

i. Equal Distance
ii. Within Legal Boundaries (state, district, mukim)
iii. Shortest Distance
iv. Minimum Physical Barriers (river, railway, highway, etc)
v. Centre of Attraction
vi. Not much variation to the existing boundary

The second stage is a model creation (Figure 3 and Figure 4). There are two models involved; the basic model and the multi-combination model.

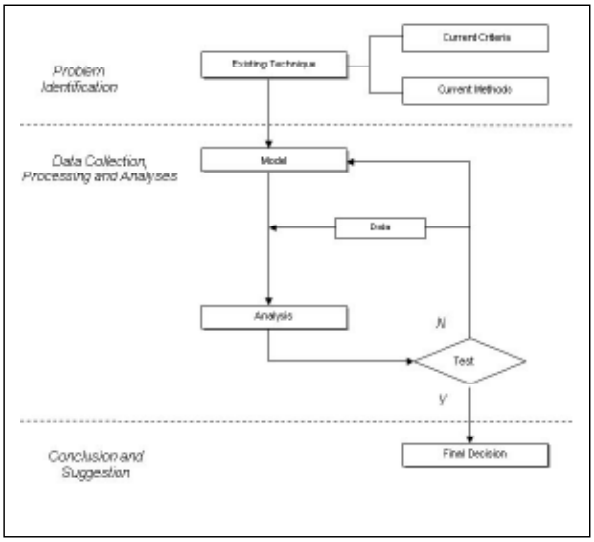



*Figure 2 : Methodology of Research*

The four basic models are Thiessen polygon, Neighbourhood Analysis, Network Analysis and Matching Area. The multi-combination models are the result from manipulations of the basic models.

Thiessen polygon (also known as Voronoi) has been used to define individual areas around each point in such a way that the polygon boundaries are equidistant from neighbouring points.

Neighbourhood analysis analyzed the relationship between objects and a similar surrounding object. In this study, the neighbourhood analysis playas significant role to identify the barrier and the analysis is to ensure that the boundary proposed will have the minimum constraint from the barriers.

Network analysis is used to manage networked facilities that fall within specific distances. In this study, the network analysis will trace a particular path (eg. shortest path) within the defined polygon.
The matching area contains a predefined polygon according to a specific justification such as size, area and shape. This model will act as a complementary method particularly to solve the isolated polygons that may occur in the analysis.

The last is the evaluation stage. The objective of this stage is to analyze and test the proposed boundary around the kariah of Muhammadiah Mosque. The advantages and disadvantages of the proposed boundary with respect to the defined criteria were investigated together with the comparative polygon shape difference between the newly designed and the existing boundary.

ARCGIS 9, ARCVIEW 3.1, MAPINFO, AUTOCAD software have been used in the full process of the study. The vector data is based on the cadastre sheet measuring according to the Cassini Coordinate System. While the aerial photograph has been used as a main source of raster image to enhance the visualization quality and overall perspective.

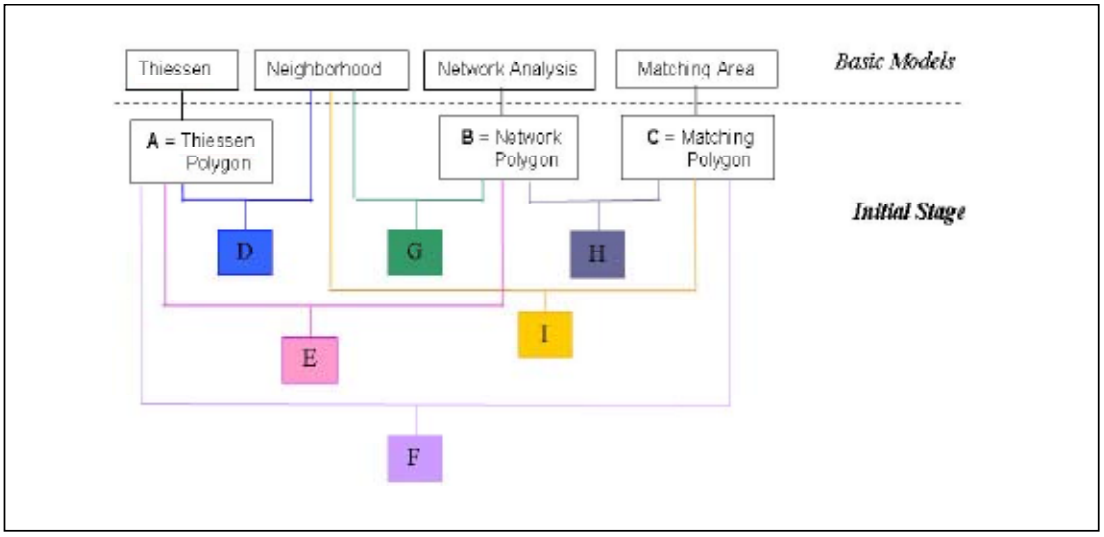



*Figure 3 : Basic Models and Initial Stage*

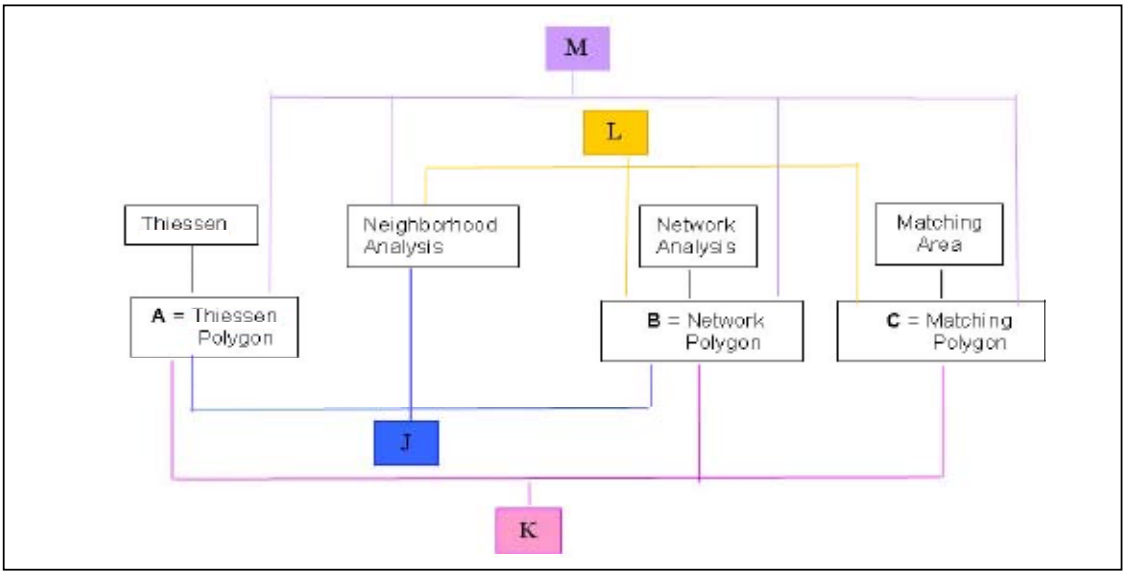



*Figure 4 : Multi-Combination*

## RESULT AND ANALYSIS

Table 2 shows the outcome from each model analysis and Table 3 and 4 show the result from the initial stage analysising, while Table 5 shows the result from multi-combination stage analysis.

It is clear that none of the techniques could be able to give the optimum result for all parameters but the result from model M in the Table 6, has significantly displayed many advantages that meet the whole criteria with minimum limitation. The whole combination of Thiessen Polygon, Neighbourhood Analysis, Network Analysis and Matching Area seem to be the most appropriate approach for the area. In addition the result also shows the minimum variation of polygon shape between the new and the existing boundary and which is considered to be very satisfactory.

## CONCLUSION

A newly improved method of boundary determination is identified in this paper. A new kariah boundary for Muhammadiah Mosque in Arau, Perlis is being proposed. The proposed solution, outline an organization of the spatial based data on the GIS capabilities to generate the kariah boundary. By using this approach, it is anticipated that each kariah boundary will be formed in a more informed manner. Combination of various approaches has its own unique implication with respect to individual location geographic matters. However in this case study it is clear that all models combination give better result for the kariah. In turn, this approach would enable rapid and efficient techniques for the boundary analysis.

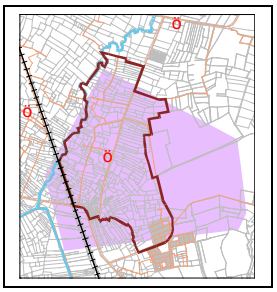
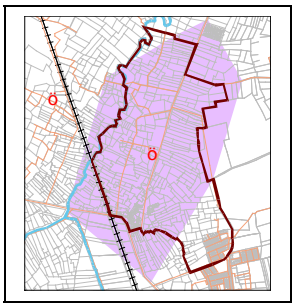
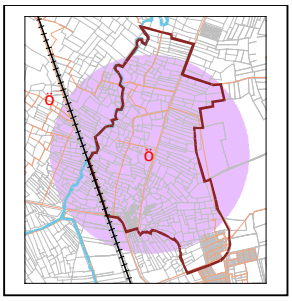
| |  |  |  |
|---|---|---|---|
| **Model** | A = Thiesseen Polygon | B = Network Polygon | C = Matching Area |
| **Advantages** | Equidistance boundary | Shortest and optimum route | Equidistance all corners |
| **Disadvantages** | Regardless Legal boundaries<br>Regardless physical barriers | Regardless Legal boundaries<br>Regardless physical barriers<br>Polygon shape is look odd (linear area) | Regardless Legal boundaries<br>Regardless physical barriers |

*Table 2 : Results from Basic Polygons Analysis*

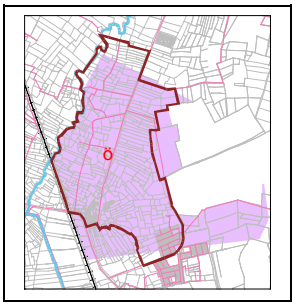
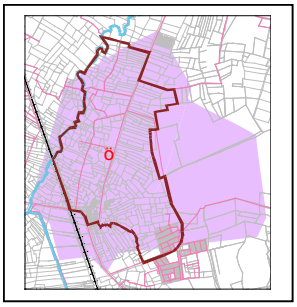
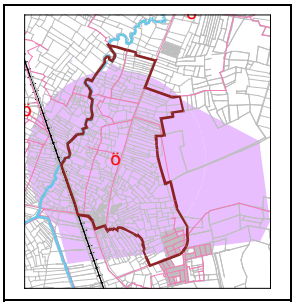
| | | | |
|---|---|---|---|
| |  |  |  |
| **Model** | D = Thiessen + Neighborhood Analysis | E = Thiessen + Network Polygon | F = Thiessen + Matching Area |
| **Advantages** | Regard physical barriers<br>Regard legal boundaries | Distance based boundary<br>Near to the centre attraction | Distance based boundary<br>Near to the centre attraction |
| **Disadvantages** | Uncertain distance elements | Regardless physical barriers<br>Regard legal boundaries | Regardless physical barriers<br>Regard legal boundaries |

*Table 3 : Result from Initial Stage Analysis*

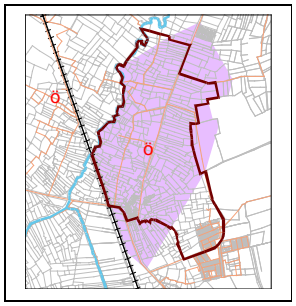
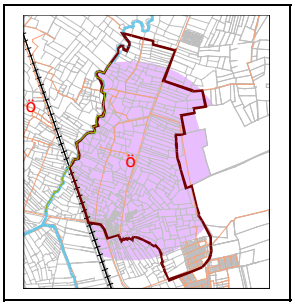
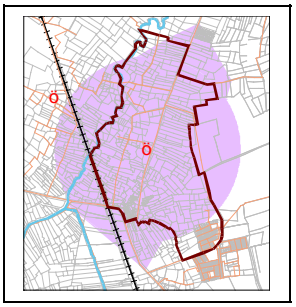
| | | | |
|---|---|---|---|
| |  |  |  |
| **Model** | G = Neighborhood Analysis + Network Polygon | H = Neighborhood Analysis + Matching Area | I = Network Polygon + Matching Area |
| **Advantages** | Shortest path<br>Regard physical barriers<br>Regard legal boundaries<br>Near to the centre attraction | Regard physical barriers<br>Regard legal boundaries<br>Near to the centre attraction | Distance based boundary<br>Near to the centre attraction |
| **Disadvantages** | Minimum | Uncertain distance elements | Regardless physical barriers<br>Regard legal boundaries |

*Table 4 : Results from Initial Stages Analysis*

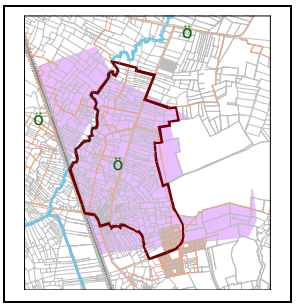
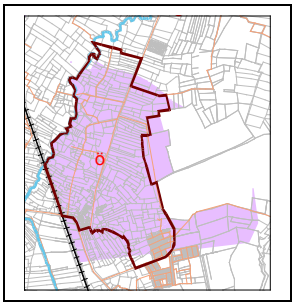
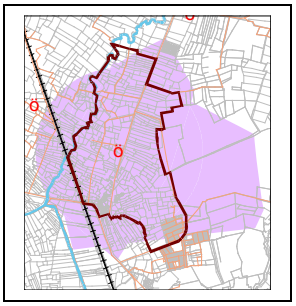
| | | | |
|---|---|---|---|
| |  |  |  |
| **Model** | J = Thiessen + Neighborhood Analysis + Network Analysis | K = Thiessen + Neighborhood Analysis + Matching Area | L = Thiessen + Network Polygon + Matching Area |
| **Advantages** | Shortest path<br>Regard physical barriers<br>Regard legal boundaries<br>Near to the existing boundary | Regard physical barriers<br>Regard legal boundaries<br>Near to the centre attraction<br>Near to the existing boundary | Distance based boundary<br>Near to the centre attraction |
| **Disadvantages** | Complicated Analysis Time taken | Complicated Analysis Time taken | Regardless physical barriers<br>Regard legal boundaries |

*Table 5 : Results form Multi Combination Stages Analysis*

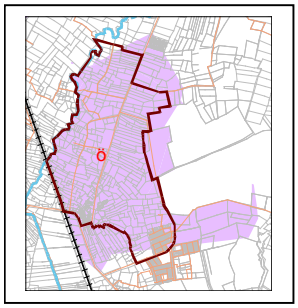
| | |
|---|---|
| |  |
| Model | M = Thiessen + Neighborhood Analysis + Network Analysis + Matching Area |
| Advantages | Shortest path<br>Regard physical barriers<br>Regard legal boundaries<br>Near to the centre attraction<br>Near to the existing boundary |
| Disadvantages | Minimum |

*Table 6 : Multi Combination Stage*

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## 10 TIPS OF ICT SECURITY IN MyGDI

1. Protect your personal information and know who you are dealing with. Do not reveal information about yourself to people or websites you do not know on the internet.
2. Create hard-to-guess passwords and keep them private.
3. Don't open emails from unknown sources.
4. Use anti-virus, anti-spyware and keep them updated regularly.
5. Update your operating system and web browser regularly.
6. Know the dangers of using File sharing or Peer-to-peer (P2P) systems as it may contain spyware and viruses. It can also create legal and ethical issues regarding the unauthorized sharing of copyrighted materials.
7. Back up your important files regularly.
8. Don't leave your computer unattended and password protect it when not in used.
9. Never reveal your true identity in chat rooms.
10. Contact helpdesk@macgdi.gov.my for any security incidents while accessing MyGDI and MyCERT if something goes wrong online.

ria@macgdi.gov.my
KKICT Section of MaCGDI

# Permodelan Kelestarian Bandar Setempat

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Bandar sebagai satu entiti kompleks perlu dilihat dari pelbagai sudut pandangan dan disiplin yang berbeza demi mendapatkan gambaran dan makna sebenar kewujudan sesebuah bandar dan sebarang perubahan yang berlaku di dalamnya. Artikel ini mengungkapkan kelestarian bandar setempat dalam kerangka permodelan yang begitu kompleks menggunakan asas ekosistem bandar. Permasalahan yang wujud di bandar tidak dapat ditangani melalui satu sudut pandangan sahaja kerana telah diakui banyak pihak bahawa permasalahan yang timbul amat berkait rapat dengan permasalahan yang lain pula. Justeru, pendekatan terintegrasi antara-disiplin, multi-disiplin dan transdisiplin merupakan pendekatan terbaik dalam menangani permasalahan yang timbul di bandar. Lantaran itu, permasalahan yang wujud itu diterjemahkan dalam bentuk permodelan untuk memudahkan pemahaman dan cuba mengatasi permasalahan tersebut dengan cara yang sebaik mungkin. Dalam hal ini, isu kelestarian bandar setempat digunakan sebagai contoh permodelan. Sistem Maklumat Geografi (GIS) yang mampu mengintegrasikan data yang ada digunakan dalam menganalisis data yang diperolehi pada skala setempat. Penyelidikan ini merupakan satu percubaan jujur dalam mengintegrasikan sains dan penyelidikan saintifik sains sosial dengan menggunakan metodologi sains dalam pengkajian bandar. Berdasarkan idea sains kompleks (*complexity science*), penyelidikan ini cuba menilai kelestarian pembandaran di wilayah Lembah Bernam-Linggi yang terletak di tengah-tengah Semenanjung Malaysia (Rajah 1). Percubaan ini adalah sebagai sumbangan pendekatan baru dalam analisis kelestarian bandar menggunakan perspektif setempat terutamanya dalam bidang sains sosial di Malaysia yang masih terikat dalam kerangka sempit sektoral.

## Lembangan Bernam – Linggi Dalam Arus Globalisasi

Perubahan pesat terutamanya perubahan fizikal yang berlaku di Lembangan Bernam – Linggi atau Lembangan Proton City – Linggi dalam tempoh lebih empat dasawarsa yang lalu amat menarik untuk diteliti disebabkan beberapa faktor. Pertamanya, kewujudannya sebagai sebahagian dari wilayah Lembah Klang yang menjadi nadi pembangunan negara. Selain itu, lokasinya adalah keseluruhan negeri Selangor yang menyumbang sebanyak 30 peratus daripada pembangunan KDNK negara. Justeru itu, kawasan ini telah dicatatkan sebagai kawasan yang menjadi tumpuan pembandaran negara ini dalam tempoh beberapa tahun akan datang dan menjadi tumpuan penting dalam Dasar Perbandaran Negara. Kawasan *mega-urban* ini akan terus menjana pembangunan ekonomi negara dan dalam masa yang sama pembangunan fizikal dan infrastruktur yang dilaksanakan jika tidak dijalankan dengan lebih berhati-hati akan memusnahkan alam sekitar sekelilingnya. Pembinaan Lapangan Terbang Antarabangsa Kuala Lumpur (KLIA) di Sepang memberikan tempias yang begitu bermakna ke negeri yang berhampiran khususnya Negeri Sembilan. Lokasi KLIA yang berhampiran akan menarik para pelancong luar negara khususnya untuk datang melancong ke tempat-tempat pelancongan yang menarik yang terdapat di Negeri Sembilan. Kesemua faktor ini menjadikan Lembangan Bernam-Linggi terus-terusan mengalami perkembangan pantas menjelang tahun 2020. Lantaran itulah, penyelidikan kecil ini mengarah kepada penelitian model yang akan menaksir kelestarian wilayah ini dalam tempoh beberapa tahun akan datang ini.


*Rajah 1 : Konurbasi Lembangan Bernam - Linggi*

## Dayahuni Sebagai Asas Kelestarian

Telah banyak yang diperkatakan terhadap pembangunan lestari atau pembangunan mampan (*sustainable development*). Namun artikel ini pula melihat hubungkaitan di antara pembangunan lestari yang diterjemahkan dalam bentuk bandar lestari. Sementara bandar lestari itu pula diteliti melalui bandar berdayahuni (*livable city*). Konsep dayahuni (*livable*) digembleng dalam artikel ini untuk meneliti aspek kelestarian bandar dalam konteks pembangunan lestari dengan mengambil Lembangan Bernam-Linggi sebagai kawasan pemerhatian. Lembangan Bernam-Linggi yang berdayahuni memberi makna bahawa penduduknya sentiasa 'ceria', sibuk dengan pelbagai aktiviti dalam persekitaran ekonomi, sosial dan fizikal yang segar, hening kehijauan, selamat, menarik dan sihat (Casselati 1997; Cities (PLUS) 2003; Girardet 2004; Salzano 1997; Timmer and Seymour 2006). Maka tumpuan pemerhatian adalah terhadap masyarakat dan kehidupan hariannya sebagaimana yang dijelmakan dalam aspek-aspek pemikiran urbanisme baru. Ciri-ciri dayahuni itu dirungkai menerusi kesan tindakan penduduk dalam lembangan ini menggunakan perkhidmatan bandar setiap hari di tempat-tempat yang menjadi tumpuan mereka, dengan bantuan pendekatan metabolisme bandar yang diperluas (Newman 1999). Pendekatan itu membolehkan pemerhatian dibuat menerusi ruang dan masa dalam satu jangka masa singkat seperti dalam satu putaran harian.

## Dinamika Dalaman Bandar Berdayahuni

Dalam memahami model yang diutarakan dalam artikel ini, satu contoh bandar yang terletak dalam Lembangan Bernam-Linggi iaitu bandar Nilai di Negeri Sembilan digunakan. Dalam usaha memahami getaran (*vibration*) ruang-masa di kawasan bandar Nilai ini, konsep metabolisme bandar (*urban metabolism*) digunakan untuk menggambarkan putaran kehidupan harian penduduknya. Konsep metabolisme bandar yang telah diperkenalkan oleh Wolman (1965) dan telah dibincangkan secara lebih mendalam oleh Newman dan Kenworthy (1999) dan Newman (2004) yang kedua-dua mereka menghujahkan bahwa bandar sebagai satu sistem yang beroperasi agak sama dengan ekosistem biologi yang mengimbangkan sumber input dan output yang terhasil dalam bentuk sisa. Bandar sebagai satu sistem begitu mudahterancam (*vulnerable*) sebagai sistem semulajadi yang lain. Jikapun keseimbangan dapat dicapai tidak semestinya bandar itu lestari disebabkan kesan-kesan dan gangguan yang tidak dijangkakan.

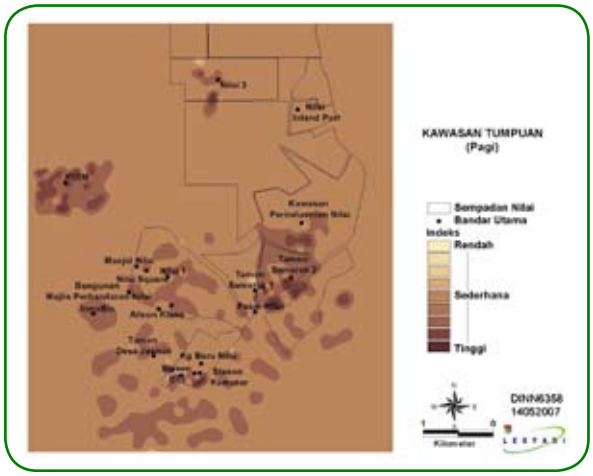
Berdasarkan konsep metabolisme bandar tadi, aktiviti ruang-masa penduduk yang menghuni di bawah kawasan Majlis Perbandaran Nilai diteliti dan diperhatikan dalam tempoh 24 jam pada hari-hari bekerja selama beberapa bulan. Data gunatanah pada skala yang lebih mendalam diperolehi dan maklumat metabolisme harian telah dikontekstualkan menggunakan GIS. Rajah 2, Rajah 3 dan Rajah 4 di bawah menunjukkan kawasan-kawasan yang menjadi tumpuan manusia pada waktu pagi, tengahari, dan petang/malam.

Majlis Perbandaran Nilai (MPN) terletak di sempadan kawsan Selangor – Negeri Sembilan. MPN telah dinaiktaraf semenjak tahun 2001 selepas mencapai pendapatan minimum RM1 juta. Kawasan yang terdapat di dalam MPN ini antara lainnya ialah Nilai Lama, Bandar Baru Nilai, Taman Semarak, Nilai Mini, Nilai 1, Nilai 2 dan Nilai 3. jumlah penduduk yang menghuni MPN telah menunjukkan pertumbuhan dalam tempoh beberapa tahun. Dalam tahun 1921, jumlah penduduk yang direkodkan berjumlah 669 orang menurun lepada 428 orang pada tahun 1970 sebelum meningkat kepada masing-masing 1,308 dan 1,698 dalam tahun 1980 dan 2000 (Jabatan Statistik 2000). Dalam tahun 2003, jumlah penduduknya dianggarkan seramai 114,134 orang yang menunjukkan peningkatan yang begitu ketara dalam tempoh tiga tahun yang lalu yang antara lainnya disebabkan oleh pengluasan kawasan MPN, di samping migrasi masuk yang begitu tinggi untuk menampung jumlah peluang pekerjaan yang meningkat di kawasan perindustrian baru yang tumbuh (Rancangan Struktur Nilai 2003)

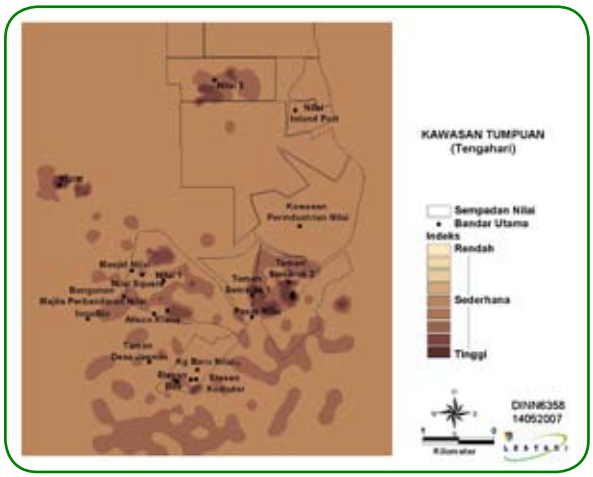
Aktiviti ruang-masa telah dibahagikan kepada tiga kategori iaitu, awal pagi (6–11 pagi); tengahari (12–4 petang) dan akhir petang/malam (6 petang–12 tengahmalam). Kawasan tumpuan utama penduduk di awal pagi ialah stesen komuter, pasar basah, dan kedai kopi yang terletak di Nilai Lama dan Taman Semarak, juga di bangunan MPN di mana penduduk memulakan tugasan harian mereka terutamanya yang bekerja di jabatan kerajaan berhampiran. Di samping itu juga, pasar basah turut menjadi tumpuan manusia yang datang untuk mendapatkan barangan harian seperti ikan, ayam, daging, sayur-sayuran dan buah-buahan. Tempat lain yang menjadi tumpuan manusia ialah kawasan sekolah dengan ibubapa

menghantar anak-anak mereka di awal pagi iaitu di antara 6.30 pagi hingga 7.30 pagi di beberapa buah sekolah yang terdapat di kawasan MPN.

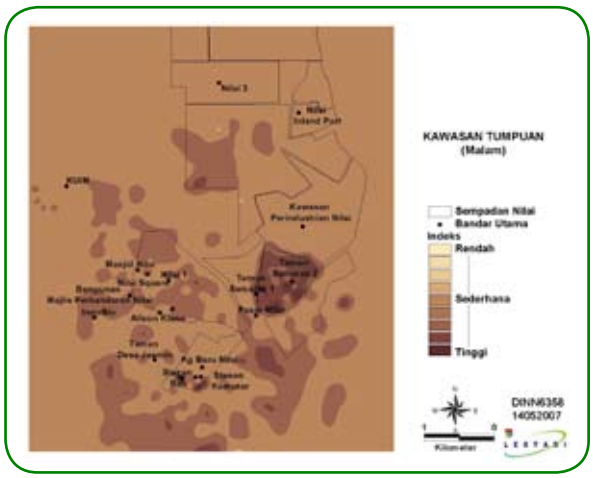
Pada sebelah tengaharinya pula (12 tengahari - 4 petang), tumpuannya lebih kepada kawasan komersil apabila kebanyakan kedai-kedai telah memulakan perniagaannya sekitar pukul 10 pagi dan 11 pagi. Kawasan komersil seperti kedai runcit, bengkel motor, bank, kedai telekomunikasi dan maklumat merupakan tumpuan utama yang kebanyakannya dikunjungi oleh pelajar sekolah dan kolej yang terdapat di sekitar bandar Nilai. Pejabat pos dan bank menjadi tumpuan yang tinggi pada sebelah tengahari. Tempat-tempat lain adalah Nilai Square, yang terletak berhampiran Hotel Alson Klana. Berbanding dengan tumpuan pada sebelah pagi, Nilai 3 menjadi tempat kunjungan utama untuk pengunjung mendapatkan barangan keperluan mereka dan mempunyai lebih pilihan untuk membelibelah.




*Rajah 2 : Kawasan Tumpuan Penduduk Pada Waktu Pagi*




*Rajah 3 : Kawasan Tumpuan Pada Waktu Tengahari*




*Rajah 4 : Kawasan Tumpuan Pada Waktu Malam*

Pada sebelah petang/malamnya pula (8 malam hingga 12 tengahmalam), kebanyakan penduduk telah berada di rumah setelah penat bekerja seharian. Namun, tempat-tempat yang menjadi tumpuan pada sebelah malam ialah kedai makan dan minum atau restoran yang menjadi satu tren baru di kalangan orang Melayu dan keluarganya tetapi tidak kepada orang Cina yang sering membawa keluarganya menikmati makam malam di kedai yang menjadi pilihan masing-masing.

## Makna Tersirat Di Sebalik Tumpuan dan Pergerakan Harian Penduduk

Apa yang boleh diperjelaskan daripada rajah yang menjadi tumpuan penduduk yang ditunjukkan adalah pergerakan reruang manusia yang menghuni MPN yang dilihat dalam ruang-masa mereka. Dua kumpulan pergerakan dapat dikesan iaitu pergerakan harian dan pergerakan tanpa bentuk (*amorphous*) ataupun tidak berstruktur. Pergerakan harian yang telah menjadi rutin kehidupan harian penduduknya dapat diperhatikan dengan jelas daripada pemerhatian yang dijalankan selama beberapa bulan itu. Di satu segi yang lain pula, pergerakan tanpa struktur itu memperlihatkan pergerakan penduduk yang menyumbang kepada peningkatan metabolisme harian penduduknya dalam menentukan bandar yang berdayahuni (*livability*) tadi. Kesemua pergerakan yang diperhatikan ini penting untuk melihat sejauhmana dayahuni harian bandar itu. Dalam merancang pembangunan bandar itu seterusnya nanti, pergerakan ini akan dapat membantu dalam menyediakan asas infrastruktur yang masih lagi kekurangan misalnya penyediaan ruang letak kereta, kawasan rekreasi dan rehat serta keperluan yang begitu mendesak untuk keseluruhan penduduknya.

Daripada segi yang lain pula, artikel ini mengartikulasikan bagaimana pengaruh globalisasi yang melanda negara dapat dilihat dengan begitu jelas daripada pergerakan dan barangan yang dijual di kedai-kedai yang terdapat. Getaran kehidupan yang dilalui penduduknya amat berkait dengan metabolisme harian yang tercerna melalui pergerakan yang dijelaskan di atas. Perkara ini akan memberikan implikasi kepada perancangan bandar pada masa hadapan.

## Penghargaan

Kami merakamkan setinggi-tinggi penghargaan terima kasih kepada Kementerian Sains, Teknologi dan Inovasi (MOSTI) yang memberikan geran penyelidikan E-Science Fund untuk membiayai penyelidikan kecil ini. Penyelidikan ini masih lagi berterusan menjelang akhir tahun 2008.

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# Development of A User Interface Application For Information Delivery System – A Case Study of Ipoh City Council's Department of Town Planning

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*Abstract*
*Town planning process requires various information such as housing, industrial and commercial area distribution, underground and public utilities as well as land use pattern of a particular urban area. While these information are mostly available at the Planning Department of a City or Municipal Council of a particular urban municipal area, their delivery was still undertaken manually.*
*Hence, it is time-consuming and tedious. In the case of Majlis Bandaraya Ipoh (MBI) on the average there are ten (10) clients looking for information per day, and the time spent to entertain them was approximately four (4) hours. To improve this information delivery, a GIS-base user-interface was developed using data from MBI and is called the Ipoh Integrated Mapping (IIM). With this application the time required to serve the same number of clients (10) is expected to be reduced to a mere approximately 1.5 hours.*
*The reduction time, subsequently would result in more information that could be delivered and more information seekers could be serviced and which consequently would increase the Planning Department's revenue. As an example, the revenue from the sale of plans would increase by almost 30% [1]. Besides the application would also reduce the man-hour requirement for information delivery as well as saving in excessive paper work.*

## INTRODUCTION

Housing, industrial and commercial area distribution, site location, underground and public utilities as well as land-use pattern of a particular urban area are a few types of information needed by various people for different planning purposes. They could be a land owner who wants to build a house, a shop owner who wants to setup offices or business outlets, a developer who seeks the possibility of developing a residential scheme or township and/or for civil engineers to perform regular inspections, maintenance and planning for future expansion of the underground utilities in order to cater for a new development in a particular area, as well as various governmental and non-governmental agencies which need these information for their day-to-day operation or decision making. in addition to the technical requirement these information may be needed for legal requirements. For instance, the recent amendment to the Town and Country Planning Act requires that certain planning applications shall be accompanied by a development proposal report that includes the following information [2]. They are status of land use and restrictions, land use analysis and intensity of development, analysis of issue and potential of sites, analysis of surrounding development and the policies of the structure and local plans.

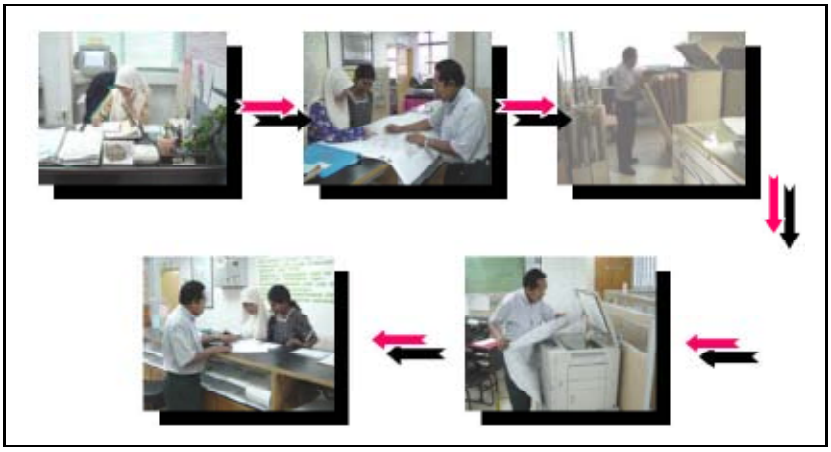

*Figure 1 : Flow Steps of Manual Information Delivery*

While these and other types of information (in hardcopy) are provided by the planning Department of a City or Municipal Council of a particular urban or municipal area, their delivery to the information user/seeker is usually human-based which involves the following steps/ activities as depicted in Figure 1.

The average time required by the front desk staff, which include technical assistant, technician, clerk and administrative assistant to service 10 clients (the average number of clients per day) by means of the above manual process is almost 4 hours. Hence the process is not only time-consuming but also limits the number of clients and the amount of information that could be delivered. Therefore there is a need to improve the information delivery system which could both reduce the time required to deliver the information and man-power and also increase the number of information seekers that could be served in a more friendly environment. This could be achieved if a computerized delivery system such as IIM is used as shown in Figure 2.

*Figure 2 : Flow Steps of Computerized Information Delivery*

In Figure 2, the information delivery activities using IIM are less compared to those in Figure 1. Hence the time required to deliver the information is also reduced to approximately 1.5 hours.

## MATERIAL AND METHOD

This section will elaborate the material and method proposed to MBI in order to improve their information delivery to their clients. It begins with data acquisition, user interface and database development, spatial data analysis and ends up with the end-product in the form of user interface application.

***Data Acquisition***

Ipoh City Council or in Malay 'Majlis Bandaraya Ipoh' (MBI) was chosen as the location for this case study due to its favourable geographical location and the availability of information required for this study. The data that were used and acquired from MBI in a digitized format are Land-use map, Road network and Housing lot. These are the information that many users (such as land owners, engineers, land developer and urban planners will ask for various purposes [3].

***Development of user-interface***

A user-interface was developed to improve the delivery mechanism to the information seekers as well as to perform spatial data analysis to support certain decision-making during planning activities. This interface was developed using Microsoft Visual Basic Version 6.0 as the programming Language [5] and the MapInfo Professional GIS software Version 7.0 [6], as the medium in which the data are kept. It is called Ipoh Integrated Mapping (IIM). The user access level and function of key menus shall be explained in the following section as well as in the appendix.

***User Access Level.***

The format of the application is shown in Figure 3 once the user is channeled to the Planning Department's database and this first form of the application is called the User Access Level. The colour of the interface is chosen based on the colours of the bougainvillea, the official flower

for Ipoh. It is noted that the User-Access Level interface is the main form on which all the events and functions associated with the application shall be worked upon and displayed.

The top left corner shows the logo of MBI which is the potential owner of this application. The interface consists of three (3) parts, viz-a-viz, on the left is the open/ close map/layers and queries function, the main tools used with the map placed on the right of the interface and the display box in the middle on which the map/layers and events for each functions and tools shall be displayed and activated correspondingly.

***Open Layer***

This has almost the same function with the Open Map where it opens the map and the difference is that the Open Layer opens the map layer by layer as in Figures 7 and 8. Explanation should arrive here. The map of which the application communicated is constructed in several layers through MapInfo application and each layer displays a different information of the map. For instance a typical map may contain spatial data on land lots, road networks, rivers, railway networks, water supply pipelines etc. and each of these data is actually constructed and incorporated in each different layer. This Open Layer function is

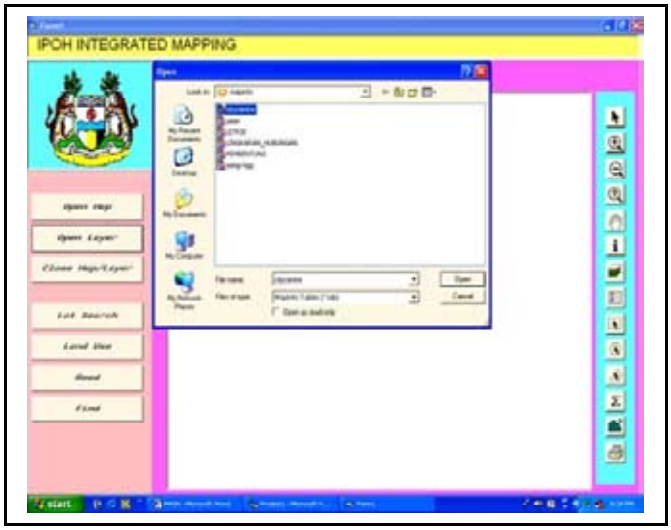


*Figure 3 : User Access Level*

***Open Map***

This is the main function of the application where it will open the map of Ipoh with coloured regions showing different types of land-use (see Figure. 6). The colour representation on these different land-use could be viewed by clicking or Show/ Hide Legend tool in the Toolbar. In fact, this Open Map function is the first and foremost thing that the user will perform before making any spatial query, for example by asking the application to show on the map the location of his/her land lot through any of the Queries function; Lot Search, Land Use, Road or Find. Since the scope of this project is only on Ipoh city centre district, the current application would only display map of the said area. Addition for other parts or districts of Ipoh could be easily incorporated by saving the new map into the same file where the current map is located

actually important and is mostly used when the layer by layer information is required for a specific task.

***Close Map/Layer***

As the name implies, this function closes the currently opened map and layers. For the latter, this function closes all layers that are currently opened simultaneously. To close layer by layer use Layer Control tool designated with from the Toolbar. It is noted that the user must use this function if he/she wishes to switch to Open Map from Open Layer and vice versa.

***Query Functions***

Query functions consist of Lot Search, Land Use, Road and Find and they are not only used by the landowner, who wish to know about their lands and developments surrouning their lands but are also used by urban planners and engineers since it shows

not only the spatial data of a particular land-use or road but also able to retrieve the files associated with that particular land or road for their planning and decision making functions.

***Lot Search***

This is one of many types of information regarding urban characteristic that is mostly enquired by the landowner who comes to the Planning Department. The Lot Search function in this application allows a user to search the file of a particular lot within for example, the city centre district of his/her concern and the user would only need to enter the corresponding lot number and the file pertaining to that particular lot will be displayed as in Figure 9.

***Land-use***

Land-use is the most important information on urban related matters since everything regarding urban infrastructure or economic development are related with land use. Thus, it is the most important information that all users from landowners to engineers and urban planners would request and need for various purposes. While Lot Search allows the user to make file search based on lot number, Land Use function allows user to search for the same file based on the type of use of land of a particular land lot. Since this information is provided by the MBI where the language medium used for all its operations and database systems is the Malay Language, the user is required to enter the type of land-use in Malay, for instance kediaman for residential, perdagangan for business, institusi for institution, kawasan lapang for open space etc.

***Road***

The query function allows the user to view associated information of a particular road within, for example, the city centre district by entering the corresponding road name. Information such as road length, width, pedestrian road width etc. are examples of the information associated with the road. This function is mostly used by staff from the Engineering and Traffic Departments for their operations as well as to support their decision making tasks (e.g. whether or not to designate a particular street as one-way traffic based on its traffic volume). The display of this query is given as in Figure 10.

***Find***

This function allows the user to make a search and display the result on the map rather than open its corresponding file and this function is more spatial based where the user for instance, can view the location of his/her lot on the map by the application highlights of the location with symbols selected by the user in this function's mechanism. The spatial distribution of the particular land-use for instance could also be produced via this function. While the input of previously discussed query functions; namely Lot Search, Land Use and Road, are based on lot number, land-use type, and road name, respectively, this Find function allows the user to make spatial search based on a wide number of inputs or characteristics such as lot identification number, owner or heights (esp. for building lot) for land lot related search. This function will be mostly used by the in-house staff either from within the Planning Department as well as that of other departments. The display of this query function is shown in Figure 11.

***Tools for Map Working***

This is referred to the tools provided at the rightmost part of the interface which consists of the necessary tools required to work with map, perform simple analysis as well as to print out map or results on queries. These are select, zoom in, zoom out, change view, pan, info tool, layer control, show/hide legend, marquee select, radius select, polygon select, show statistics, object info and print.

## OUTCOME OF END-PRODUCT

With the user interface such as the IIM, the information delivery and certain query for decision-making process could be carried out with the least of assistance from the front desk personnel. Examples of the typical information delivery and the query scenarios are shown in Figures 4 and 5. The searching and delivery of the information is expected to be four (4) times faster than that of manual delivery and hence four (4) times as many clients could be served at any one particular time. The displays of the IIM windows during information delivery and query process are presented in Figure 6 to 11.

***Example of Information Delivery Process Flow***

The typical of information delivery process flow using IIM is shown in Figure 4. The scenario is also shown in Figure 3.

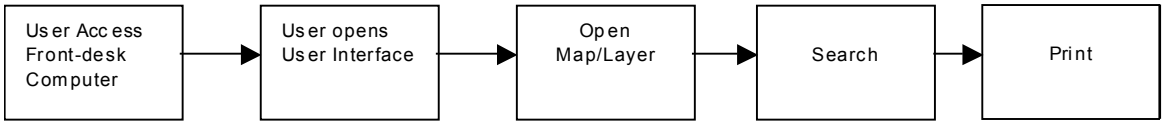


*Figure 4 : Information Delivery Process Flow using IIM*

***Example of Query/Decision-making/ Spatial Analysis Process Flow***

An example of a query process flow to know the road width of a certain road is shown in Figure 5. From this query process, a decision could be made whether or not the width of that road stretch is still suitable for that particular locality.


*Figure 5 : Query Process Flow using IIM*

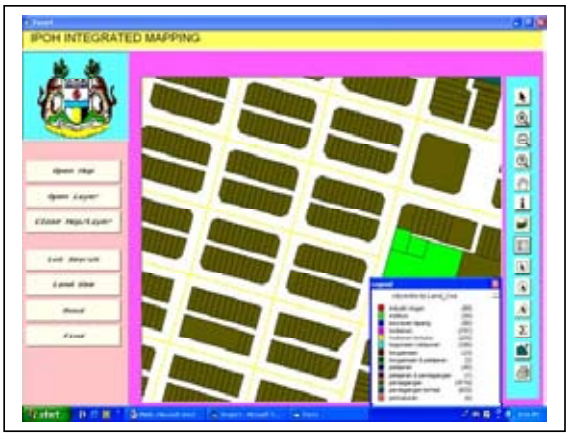


*Figure 6 : Map appears when Open Map command is clicked*

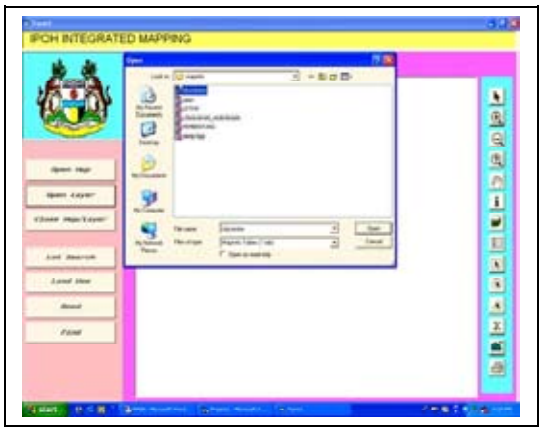


*Figure 7 : Open Layer function allows user to open map layer by layer for specific task.*

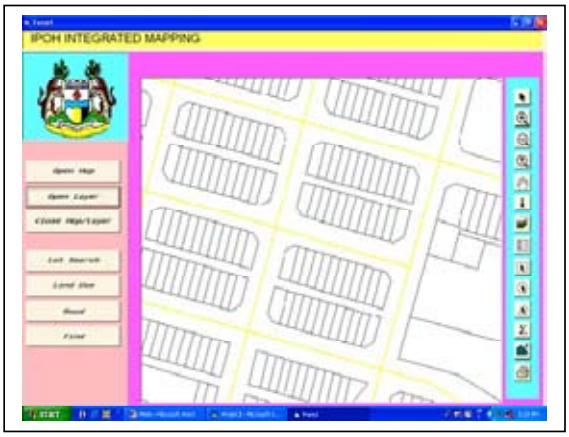


*Figure 8 : Shown are layer of land lots by polygon in black and layer of road networks by line in yellow*

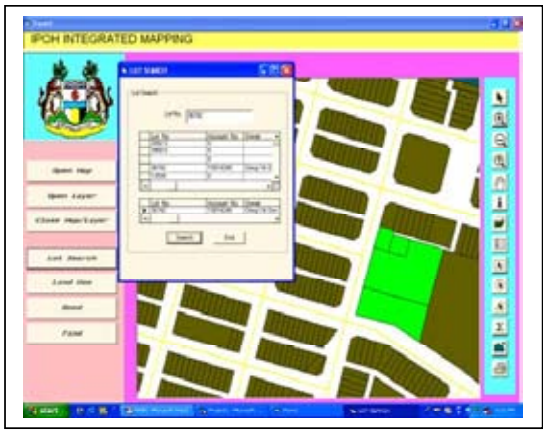


*Figure 9 : Lot Search Window shows not only the searched file of a particular lot (bottom table of the window) but also allows the user to browse through the entire database of every recorded lot (top table of the window)*

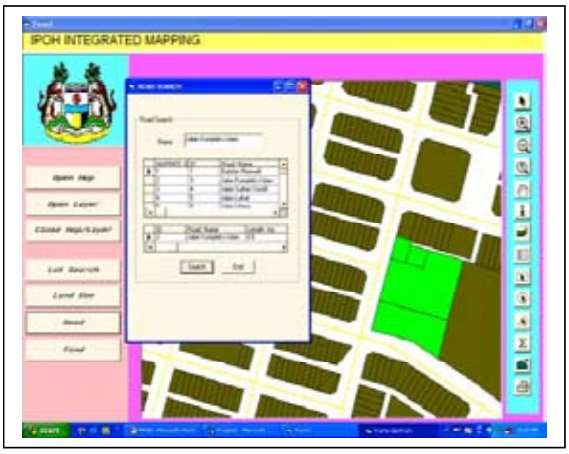


*Figure 10 : Road function allows user to view corresponding file of a particular road*

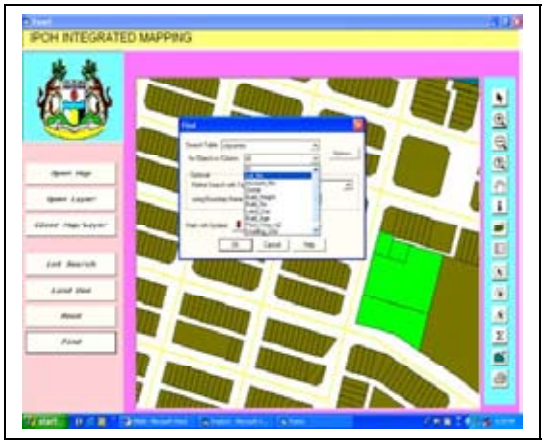


*Figure 11 : Find function allows user to perform spatial search based on a wide array of search inputs as shown in the drop-down menu of the Find window*

## DISCUSSION AND CONCLUSION

A computerized information delivery system such as IIM will improve significantly the information delivery to the clients of MBI. It is expected to be four (4) times as fast compared to manual information delivery. At the same time it is expected that more clients ((four (4) times as many)) could be entertained at any one particular time. A better utilization of human resources will also be possible with this application in place since less personnel or none would be required to perform a very basic routine job (manual file search, photocopying, etc) instead he/she could be assigned for job with higher role profile which will improve the human resource utilization in the organization. Generally, by implementing the computerized information delivery system, the revenue of the department concern would increase by almost 30%. Besides the IIM implementation would also improve communication within the department and with less paper work.

However, prior to embarking on such a system, additional budget and additional training for a certain number of staff will be required. Nevertheless in the long run the organization will gain by implementing such a system.

## ACKNOWLEDGEMENTS

The author would like to thank the Department of Town Planning of Majlis Bandaraya Ipoh and Majlis Perbandaran Taiping for their assistance in the preparation of this paper. Special thanks also goes to Mr Mohamad Shahrustami bin Mohd Nadzeri for compiling and developing the user interface for this study.

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# Lawatan Teknikal ke Agensi-Agensi Geospatial di Western Australia

Siti Zaleha binti Yusof
Pusat Infrastruktur Data Geospatial Negara (MaCGDI)
Kementerian Sumber Asli dan Alam Sekitar (NRE)

## Pengenalan

Pusat Infrastruktur Data Geospatial Negara (MaCGDI) telah melantik perunding ERAS bagi melaksanakan Kajian Keberkesanan Pelaksanaan MyGDI mulai Oktober 2006. Salah satu skop kajian adalah Kajian Penanda Aras (*Benchmark*) MyGDI dengan GDI Negara lain yang mempunyai struktur yang hampir sama dan diperakui cemerlang di dunia. Untuk tujuan lawatan ini beberapa agensi yang telah melaksanakan sistem yang hampir serupa di Western Australia telah dipilih seperti WA Land Information System (WALIS), Department Of Land Information (Landgate), Western Australia Remote Sensing Centre dan NGIS Australia Pty Ltd.

Antara tujuan dan motivasi bagi lawatan teknikal ini adalah:

- Mengkaji bagaimana Agensi-agensi Geospatial Australia sangat berdayasaing dalam perolehan Return of Investment (ROI) dengan cepat;
- Mengkaji kelicinan Agensi Geospatial di Australia berkongsi data geospatial, membangunkan aplikasi Landgate dan penyebaran data geospatial yang berkapasiti tinggi untuk Stakeholders dan Rakyat;
- Mengkaji konsep dan mekanisma kekuatan gandingan di antara Kerajaan - Swasta dalam merealisasikan pembangunan geospatial di Australia yang berindustri berbilion ringgit (Billion Dollar Industry); dan
- Mempelajari tahap kesediaan data geospatial dan Akta-akta Geospatial yang telah dibangunkan.

Adalah diharapkan lawatan ini dapat memberi impak kepada MaCGDI dan agensi-agensi dalam usaha memajukan MyGDI dan Pusat Maklumat Geospatial Negara (NGDC).

## Hasil Lawatan

Hasil lawatan yang diketuai oleh Tuan Haji Mohd Ibrahim bin Haji Abu Bakar (TKSU II) Kementerian Sumber Asli Dan Alam Sekitar, membawa delegasi seramai 13 pegawai dari pelbagai agensi dan negeri, serta dari pihak perunding sendiri. Lawatan dari 1 hingga 5 Mei 2007, mula bertolak dari KLIA pada cuti Hari Buruh dan selamat tiba di Lapangan Terbang Perth pada jam 3.00 petang waktu tempatan.

Senarai peserta lawatan teknikal adalah seperti berikut :

- Tn. Hj Mohd Ibrahim bin Haji Abu Bakar (TKSU II, Kem. Sumber Asli dan Alam Sekitar)
- En. Mohd Jamal bin Mahussin (Pengarah UPEN, Perak)
- En. Faizan bin Abdul Rahman (Timb. Pengarah Bhg. Penilaian, JPPH, Putrajaya)
  Tn. Hj. Mohamad Kamali bin Adimin (Pengarah Seksyen Kartografi, JUPEM, KL)
- En. Mohd Shukri bin Azam (KPP (Makro), UPEN Terengganu)
- Pn. Halimatun binti Pawan (KPP (Penilaian), JPPH, Ipoh)
- Pn. Mariyam binti Mohamad (KPP (Pembangunan Sistem 1), MaCGDI)
- Pn. Zaleha @ Siti Zaleha binti Yusof (KPP (Pengurusan Data), MaCGDI)
- Tn. Hj. Mohaizi bin Mohamad (Lead Consultant, ERAS)
- En. Richard Teh Eng Koon (Consultant, ERAS)
- Dr. Sharifah Mariam bin Syed Mohammed Alhabshi (Consultant, ERAS)
- Cik Nazirah binti Mohaizi (Urusetia, ERAS)
- Cik Sarah binti Hisham (Urusetia, ERAS)

*Sesi taklimat teknologi ER Mapper, Geosamba dan iDelve di University of Western Australia (UWA)*

Lebih kurang 3 hari bermula dari 2 Mei sehingga 4 Mei, kami telah melawat ke beberapa agensi serta diberi taklimat dan mengadakan perbincangan yang sangat memberi manfaat. Antara agensi yang dilawati adalah:

- Department Of Land Information (DLI)
- WA Land Information System (WALIS)
- WA Remote Sensing Centre
- ER Mapper
- NGIS Pty Ltd.

Sesi taklimat padat juga dapat di kongsi berkaitan:

- DLI - Data capture and distribution process
- DLI - Data Custodion issue
- Introduction to SLIP (Shared Land Information Portal)
- Landgate Portal
- Metadata Policies and implementation in WA and Australia
- WALIS organization structures
- Other WALIS Initiatives
- WALIS Comittees
- WALIS interaction with stakeholders
- WA Remote Sensing Centre – Product and process delivery
- ER Mapper Technology
- Introduction to NGIS
- Geosamba Application
- Common Spatial Introduction Initiative (CS2i)
- Introduction to Amristar
- iDelve Application

WALIS berkongsi pejabat yang sama dengan Landgate merupakan agensi pusat bagi Western Australia yang bertanggungjawab menyelaras menyusun dan membangun strategi, standard dan polisi bagi pengurusan perkongsian data. Setelah 25 tahun, WALIS nempaknya berjaya didalam pelaksanaan GDI kerana sokongan yang kuat dari *Western Australia Geospatial Community*, walaupun mempunyai kakitangan seramai 9 orang sahaja.

*Department of Land Information (DLI),* yang juga dikenali sebagai *Landgate* adalah merupakan agensi yang menguruskan tanah di Western Australia. Landgate terdiri dari beberapa agensi yang berkaitan tanah seperti Department of Land, Department of Survey, WA Remote Sensing Centre dan Department of Valuation.

*Khusyuk mendengar taklimat di NGIS.*

*Perbincangan bersama pegawai WA Remote Sensing Centre*

*Lawatan ke pejabat WA Remote Sensing Centre.. tercabut pula poster*

*Setelah kepenatan di dalam coaster..*

*Bergambar kenangan di Boldpark, salah satu tempat menarik di Perth*

*Mengabadikan kenangan bersama Dr Marnie Leybourne, Pengarah WALIS*

# MaCGDI participated in the 26th Annual ESRI International User Conference, San Diego, USA

Dr. Zainal bin A. Majeed
Pusat Infrastruktur Data Geospatial Negara (MaCGDI)
Kementerian Sumber Asli dan Alam Sekitar (NRE)

**Twenty-Sixth** Annual ESRI International User Conference (UC) was held from 07 - 11 August 2006 and it was the largest GIS Conference in the world. For the year 2006, ESRI celebrated its 10 years anniversary at the San Diego Convention Center in San Diego, California. The theme of the conference is "Geography and GIS - communicating our world".

About 15,000 people, whom are users from more than 120 countries attended to learn new skills, share information and discover the best practices and tips and techniques that they can instantly use. This year, three officers from MaCGDI, namely Dr. Zainal bin A. Majeed, Puan Ria binti Sachlin and Y.Bhg. Datin Paduka Jawahiril Kamaliah binti Mohamad attended the conference. The ESRI International User Conference (UC) brought the GIS community together for an intensive week of technology briefings, technical workshops, panel discussions, user meetings, presentation of professional papers and special events.

As in past years, Monday's programme was dedicated to plenary sessions —while 380 technical workshops filled the agenda for the whole day of Tuesday, Wednesday, Thursday and Friday. There were over 200 technical workshops being held. For most people this is the reason for them to come to the UC. From this workshop, users would be able to listen to products staff explaining how it works, and why it works in a particular way and would get the opportunity to ask questions.

On the other hand, Pre-conference seminars, including the Education User Conference and the Survey and GIS Summit took place on Saturday and Sunday. One of the presenters in the Survey and GIS Summit was Dr. Zainal bin A. Majeed from MaCGDI, Malaysia. Dr. Zainal bin A. Majeed presented a current issue entitled "From Survey to GIS-Ready Information: Management within GIS Environment". He presented the research undertaken to investigate how geospatial data handling techniques and technology can be potentially used to enhance the existing management of an entire survey datasets from their captured stage to a GIS-ready state and the delivery of this to the user. The conference attended by MaCGDI has given a lot of experience, knowledge, practical ideas on software and database development, GIS trends, ICT skills and geospatial technologies. Since the sessions were held concurrently, they were separated so that all relevant sessions can be attended and benefited. It is hoped that MaCGDI participates and contributes papers in this event every year.


*MaCGDI participated in ESRI International User Confrence 2006*

In parallel to these events, the Map Gallery featured more than 800 maps produced by ESRI users around the world and the 240,000 square -feet Exhibit Pavilion accomodated booths from 285 geospatial companies, public agencies, and non-profit organizations.

# Seminar MyGDI Peringkat Negeri Selangor Anjuran MaCGDI Dengan Kerjasama Kerajaan Negeri Selangor

Norazmel bin Abd. Karim
Pusat Infrastruktur Data Geospatial Negara (MaCGDI)
Kementerian Sumber Asli dan Alam Sekitar (NRE)

## PENGENALAN

Pusat Infrastruktur Data Geospatial Kebangsaan (MaCGDI) merupakan sebuah projek peringkat nasional yang menyediakan infrastrukturuntukmenyokong perkongsian maklumat yang melibatkan pelbagai jabatan dan agensi negeri. Di sini amalan perkongsian pintar antara jabatan dengan agensi negeri secara tidak langsung meningkatkan pengurusan pentadbiran awam di Selangor terutamanya dari aspek perancangan dan pembangunan berkaitan dengan tanah melalui penggunaan ICT dan teknologi GIS.


Perkembangan teknologi maklumat geografi (GIS) dan teknologi ICT telah memberi ruang seluas-luasnya kepada masyarakat untuk mencuba pendekatan-pendekatan baru bagi melaksanakannya ke dalam sistem pentadbiran sesuatu organisasi atau negara. Penggunaan GIS telah terbukti dapat melicinkan prosedur pentadbiran dalam membuat keputusan, perancangan dan perlaksanaan dasar.

Konsep ini amat penting untuk kita mengharungi arus globalisasi dan dunia tanpa sempadan.

## PROGRAM SEMINAR DAN PAMERAN GIS

Seminar MyGDI Peringkat Negeri Selangor telah berjaya dilaksanakan di Quality Hotel, Shah Alam pada 27 Disember 2006 dan telah dirasmikan oleh Y.Bhg. Dato' Noordin bin Sulaiman, Timbalan Setiausaha Kerajaan Negeri Selangor (Pembangunan) dan seterusnya mengadakan lawatan ke sudut pameran bagi melihat teknologi dan pembangunan GIS yang terkini yang dipersembahkan oleh MaCGDI.

Seminar ini telah dihadiri lebih daripada 100 peserta dari pelbagai agensi di negeri Selangor. Peserta-peserta ini terdiri daripada Unit Perancang Ekonomi, Majlis Bandaraya Shah Alam, Majlis Perbandaran Subang Jaya dan Majlis Perbandaran Petaling Jaya turut serta dalam seminar ini.

Di seminar ini, empat kertas kerja telah dibentangkan bagi perkongsian data / maklumat dan penggunaan GIS dalam membuat keputusan/ dasar, perancangan, pelaksanaan, pemantauan dan penguatkuasaan secara tepat dan cepat terhadap sesuatu pembangunan yang dijalankan. Pembentang-pembentang kertas kerja terdiri daripada Sr. Dr. Zainal bin A. Majeed dan Puan Zaleha binti Yusof dari MaCGDI, En. Amiruddin bin Mohamad dari MPSJ dan juga pensyarah Prof. Madya Dr. Khoiri Mohd Dimyati dari UiTM Shah Alam.


*Y.Bhg. Dato' Noordin bin Sulaiman (TSUK) merasmikan Seminar MyGDI Peringkat Negeri Selangor*

Seminar ini bermatlamat untuk:

- Memberi pendedahan dan meningkatkan pengetahuan mengenai teknologi GIS yang terkini;
- Memaklumkan kepada peserta, agensi-agensi pembekal data dan pengguna data mengenai isu-isu keselamatan, dasar dan hak cipta data geospatial; dan
- Mewujudkan suasana perkongsian maklumat dan idea antara peserta.

*Lawatan ke sudut pameran MaCGDI oleh Y.Bhg. Dato' Noordin bin Sulaiman*

Maklum balas yang diterima daripada pihak kerajaan negeri Selangor amatlah memberangsangkan dengan kesudiannya berkongsi maklumat geospatial dengan pihak MaCGDI supaya maklumat geospatial tersebut dapat digunakan secara optimum oleh semua lapisan masyarakat amnya.

Di samping itu, sudut pameran MaCGDI juga diadakan bagi mempersembahkan aplikasi MyGDI dan G4E supaya dapat menarik peserta seminar untuk melihat, mendengar dan mencuba sendiri aplikasi-aplikasi tersebut.

*Penyampaian cenderahati oleh En. Baharudin bin Ahmad kepada penceramah dari Majlis Perbandaran Subang Jaya*

**KESIMPULAN**

Secara keseluruhannya, Seminar MyGDI Peringkat Negeri Selangor berjaya dilaksanakan dan Agensi-agensi Berkaitan Tanah (ABT) telah memberi reaksi positif terhadap peranan MaCGDI dalam memacu pihak-pihak berkenaan ke arah perkongsian data khususnya di kalangan agensi-agensi di negeri Selangor.

# AKTIVITI MaCGDI

## Mesyuarat Jawatankuasa Teknikal Framework MyGDI

Mesyuarat Jawatankuasa Teknikal Framework MyGDI Bil. 1/2007 ini telah diadakan di Hotel Sheraton, Labuan pada 16 April 2007, yang dipengerusikan oleh Y.Bhg Dato' Sr Dr. Abdul Kadir Bin Taib. Mesyuarat ini disertai oleh 30 agensi-agensi pembekal data MyGDI.

## MESYUARAT JAWATANKUASA TEKNIKAL STANDARD MyGDI (JTSM)

Pada 17 April 2007 bertempat di Hotel Sheraton Labuan telah diadakan satu Mesyuarat Jawatankuasa Teknikal Standard MyGDI (JTSM) Bil. 1/2007 yang telah dipengerusikan oleh Encik Hasan bin Jamil Pengarah Ukur dan Pemetaan Malaysia Wilayah Persekutuan Kuala Lumpur/ Putrajaya.

# AKTIVITI MaCGDI

## Mesyuarat Jawatankuasa Teknikal Clearinghouse MyGDI

Mesyuarat Jawatankuasa Teknikal Clearinghouse MyGDI Bil. 1/2007 yang dipengerusikan oleh Puan Fuziah binti Abu Hanifah, Pengarah MaCGDI telah diadakan di Tingkat 13 Bangunan Wisma Sumber Asli, Kementerian Sumber Asli dan Alam Sekitar (NRE), Putrajaya pada 05 April 2007.

## Taklimat Framework dan Bengkel Penentuan Harga Data Geospatial


Satu Taklimat Framework dan Bengkel Penentuan Harga Data Geospatial telah diadakan di Hotel New Pacific, Kota Bharu, Kelantan Darul Naim pada 2 hingga 3 Julai, 2007. Taklimat framework ini dipengerusikan oleh Y.Bhg. Dato' Sr. Dr. Abdul Kadir bin Taib selaku Pengerusi Jawatankuasa Teknikal Framework MyGDI (JTFM).

# GIS SANA SINI

## *LAWATAN DARI KAKITANGAN BANDAR NUSAJAYA DEVELOPMENT SDN BHD (BNDSB) PADA 7 MEI 2007*

Tujuan lawatan bagi mengetahui dengan lebih lanjut tentang sistem pangkalan data GIS yang telah dibangunkan oleh MaCGDI sebagai garis panduan BNDSB untuk bangunkan sistem pangkalan data GIS bagi kawasan Wilayah Pembangunan Iskandar (WPI).

## Lawatan dari UiTM, UPM dan UTM ke MaCGDI

# EXPO HARTA INTELEK
# PAMERAN HARI HARTA INTELEK NEGARA 2007

YB. Datuk Mohd Shafie bin Haji Apdal iaitu Menteri Perdagangan Dalam Negeri dan Hal Ehwal Pengguna sedang melawat booth pameran MaCGDI.

Pameran Hari Harta Intelek Negara 2007 telah dianjurkan oleh Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna (KPDN & HEP) dengan penganjuran bersama oleh Perbadanan Harta Intelek (MyIPO) di Kuala Lumpur Convention Centre (KLCC) di Conference Hall 1,2,3, Banquet Hall dan Ballroom 2 pada 26 -29 April 2007.


# AKTIVITI MaCGDI

## PAMERAN DI SEMINAR CABARAN IMPLEMENTASI ICT KEPADA KETUA-KETUA JABATAN DAN PEGAWAI-PEGAWAI KANAN NEGERI PAHANG DARUL MAKMUR


Seminar Cabaran Implementasi ICT kepada Ketua-ketua Jabatan dan Pegawai-pegawai Kanan Negeri Pahang ini telah dianjurkan oleh Unit Pengurusan Teknologi Maklumat, Pahang pada 14 dan 15 Mei 2007 dan telah dirasmikan oleh YB Setiausaha Kerajaan Pahang. Seminar ini telah berlangsung di Hotel Holiday Villa Cherating dengan jayanya.

## 2nd NGIS Conference & Exhibition di PWTC, Kuala Lumpur

# GIS SANA SINI


**Pameran Pusat Sains Negara di Desa Peringkat Negeri Johor di Mersing**

**Pameran Perniagaan sempena Ulangtahun Pertama Hari Kesedaran Bencana Anjuran Jabatan Perdana Menteri berlangsung di PWTC, Kuala Lumpur pada 26 hingga 27 Disember 2006.**

**Y.B Dato' Seri Mohamed Nazri bin Abdul Aziz (Menteri di Jabatan Perdana Menteri) sedang mendengar taklimat Pembangunan G4E daripada Ketua Seksyen Pembangunan Aplikasi GIS, MaCGDI.**

# BULETIN GEOSPATIAL SEKTOR AWAM

## FORMAT DAN GARISPANDUAN SUMBANGAN ARTIKEL

********************

Buletin Geospatial Sektor Awam diterbitkan dua (2) kali setahun oleh Pusat Infrastruktur Data Geospatial Negara (MaCGDI). Sidang Pengarang amat mengalu-alukan sumbangan sama ada berbentuk artikel atau laporan bergambar mengenai perkembangan Sistem Maklumat Geografi di Agensi Kerajaan, Badan Berkanun dan Institusi Pengajian Tinggi.

**Garispanduan Untuk Penulis**

Manuskrip boleh ditulis dalam Bahasa Melayu atau Bahasa Inggeris.

Setiap artikel yang mempunyai abstrak perlu ditulis dengan huruf condong (italic).

Format manuskrip adalah seperti berikut:

| | |
|---|---|
| Jenis huruf (font) | : Arial |
| Saiz huruf bagi tajuk | : 12 |
| Saiz huruf | : 10 |
| Langkau (spacing) | : *single* |
| Margin | : Atas, bawah, kiri & kanan = 2.5cm |
| Justifikasi teks | : Kiri |
| Lajur (column) | : Satu lajur setiap mukasurat |

Sumbangan hendaklah dikemukakan dalam bentuk softcopy dalam format Microsoft Word.

Semua imej grafik hendaklah dibekalkan dalam format .tif atau .jpg dengan resolusi tidak kurang daripada 150 d.p.i.

Segala pertanyaan dan sumbangan hendaklah dikemukakan kepada :

Ketua Editor

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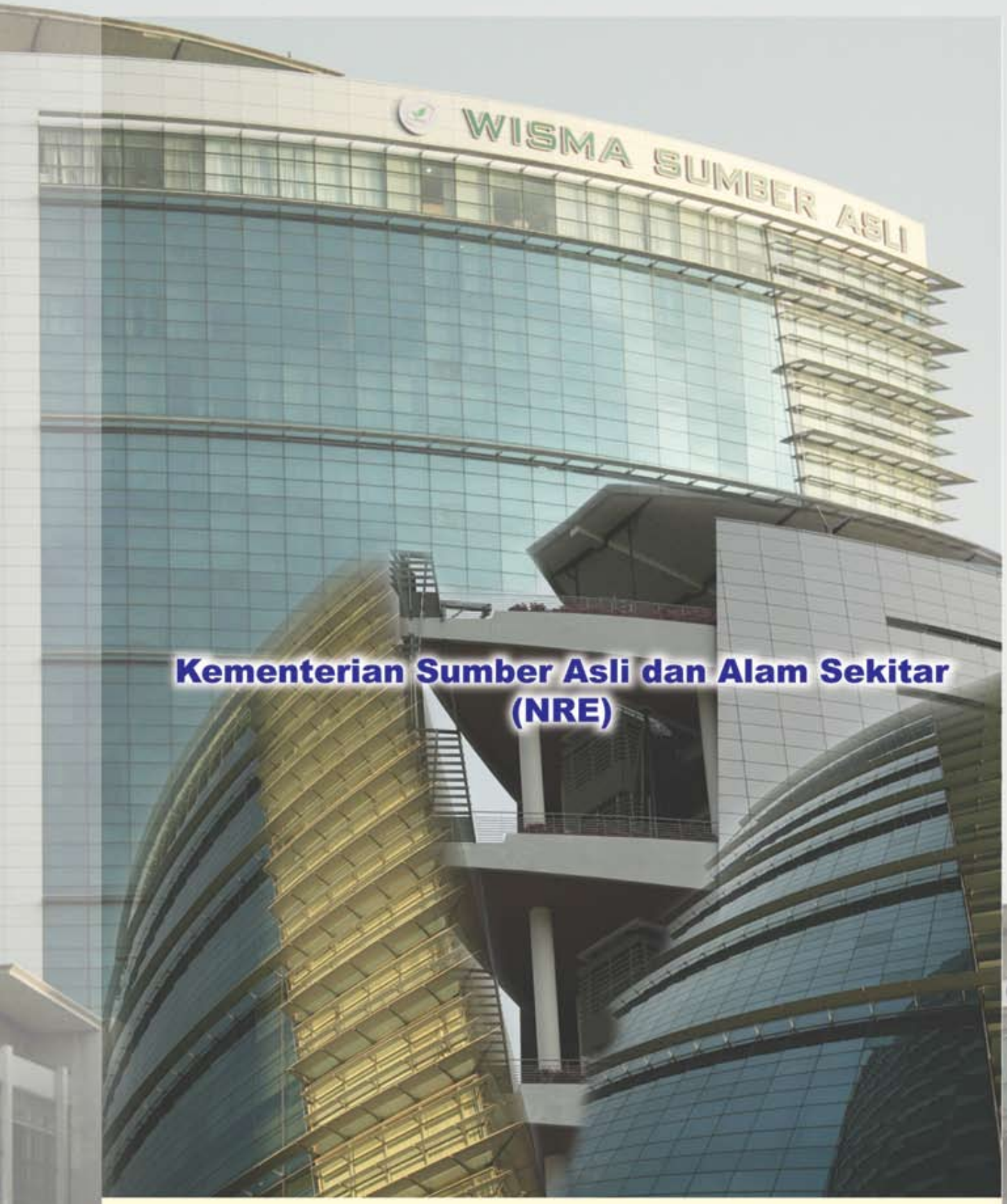


# Kementerian Sumber Asli dan Alam Sekitar (NRE)



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