

Article

A Systematic Approach of Optimal Land-Use Planning by Applying Geo-Environmental Techniques: A Case Study

Essam A. Morsy ^{1,2}

¹ Department of Environmental and Health Research, Umm Al-Qura University, P.O. Box 6287, Makkah 21995, Saudi Arabia; essambrahem@uqu.edu.sa

² Geophysics Department, Faculty of Science, Cairo University, Giza P.O. Box 12613, Egypt

Abstract: This article demonstrates the capabilities and integrity of the environmental geological and geophysical techniques for planning the suitability of the extension of Helwan city for construction and engineering purposes. The geological and topographical mapping were utilized as well as environmental geophysical techniques (seismic refraction, ground penetrating radar (GPR), and resistivity soundings) for optimal land-use planning. The seismic refraction profiles were conducted to evaluate the geotechnical characteristics of the bedrock, GPR was applied to define the main subsurface reflectors, and the geoelectrical resistivity survey was used to identify the subsurface stratigraphic sequence and the distribution of main structural elements impacting the investigated area. The integrated results and findings of the environmental geological and geophysical survey inferred two major distinctive subsurface layers: a thin surface layer represented by highly weathered limestone, with an average thickness of 3 m, and a bottom layer equivalent to the bedrock composed of hard limestone. In addition, GPR performed an analysis of two remarkable subsurface layers, which supported the generated model of other geophysical surveying techniques. Finally, all the geological and various geophysical techniques were integrated and merged to generate the optimal land-use plan of the extension of Helwan city for construction and engineering purposes and to avoid high-risk areas to reserve the sustainability of the new urban communities.

Keywords: integrity; environmental; geological; geophysical; sustainability



Citation: Morsy, E.A. A Systematic Approach of Optimal Land-Use Planning by Applying Geo-Environmental Techniques: A Case Study. *Appl. Sci.* **2023**, *13*, 1749. <https://doi.org/10.3390/app13001749>

Academic Editor: Juanbo Gao

Received: 17 November 2022

Revised: 15 January 2023

Accepted: 27 January 2023

Published: 30 January 2023



Copyright: © 2023 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

As populations grow, available land will become a scarce natural resource, especially for the already-existing urban communities. As more land is planned to be developed, effective planning will counteract the negative effects of its use and development. The numerous benefits of effective land-use planning can include the following: creating a generic framework for the proposed urban project, aiding the anticipation of the future plan of the investigated site, implementing sustainable infrastructure utilities, direct positive impact on the local urban economy, optimal use and conservation of natural resources along with protection of the environment, minimizing the associated risks of the natural hazards, and avoiding land-use conflicts [1–3].

For an optimal planning and effective development of the investigated site, a suggested joint integrated approach of geophysical methods including the electrical resistivity, seismic refraction methods, ground penetrating radar, and geological mapping were implemented throughout the study area. Geophysical indicators, including electrical resistivity, seismic velocity, and electromagnetic signature, give a clear image about the subsurface layering sequence and the degree of rock weathering or fracturing [4,5].

The investigated site is situated at the southeastern sector of Cairo, Egypt, which was designated for a proposed residential extension of the already-existing Helwan city, to reduce/minimize the random distribution of the unplanned urbanization in addition to providing millions of job opportunities, which takes into account the provision of a

Land Use Planning Abstracts Volume 4

Theodora Kimball Hubbard

Land Use Planning Abstracts Volume 4:

Urban Mass Transportation Abstracts ,1982 **Energy Abstracts for Policy Analysis** ,1980 Energy Research Abstracts ,1977 Semianual with semiannual and annual indexes References to all scientific and technical literature coming from DOE its laboratories energy centers and contractors Includes all works deriving from DOE other related government sponsored information and foreign nonnuclear information Arranged under 39 categories e g Biomedical sciences basic studies Biomedical sciences applied studies Health and safety and Fusion energy Entry gives bibliographical information and abstract Corporate author subject report number indexes **Urban Transportation Abstracts** ,1984 Manual of Information on City Planning and Zoning Theodora Kimball Hubbard,1923 **Highway Noise; a Design Guide for Highway Engineers** Bolt, Beranek, and Newman,Bolt, Beranek, and Newman, inc,1971 Various methods of assessing noise loudness and noise annoyance are reviewed and explained sources types and intensities of traffic noise are noted typical means of abatement and attenuation are described design criteria for various land uses ranging from low density to industrial are suggested and compared with the results of previous BBN and British systems for predicting annoyance and complaint and a design guide for predicting traffic noise capable of being programmed for batch and on line computer applications is presented in form suitable for use as a working tool A flow diagram describes the interrelationships of elements in the traffic noise prediction methodology and each element is discussed in detail in the text The text is presented of a tape recording that takes the listener through a series of traffic situations with such variables as traffic distance flow velocity distance outdoors and indoors and presence or absence of absorbers and attenuators Scientific and Technical Aerospace Reports ,1979 EPA Cumulative Bibliography United States. Environmental Protection Agency,1976 Vols for 1970 76 include reports bibliography and separate title subject corporate author personal author contract number and accession report number indexes **Library Searching** Jacquelyn M. Morris,Elizabeth A. Elkins,1978 Manual of Planning Information Theodora Kimball Hubbard,1923 **Planning Information Up-to-date** Theodora Kimball Hubbard,1928 **The Engineering Index** ,1929 **U.S. Government Research & Development Reports** ,1970 City Manager Magazine ,1926 Beginning in 1925 the March issue contins the association s proceedings **The President's Report** Northwestern University (Evanston, Ill.),1928 **Engineering Index** ,1925 **Government Reports Announcements & Index** ,1977-11 **Behavior & Society** ,1979 **Engineering Journal** ,1919 Vol 7 no 7 July 1924 contains papers prepared by Canadian engineers for the first World power conference July 1924 Index of Conference Proceedings British Library. Document Supply Centre,2001

The Enigmatic Realm of **Land Use Planning Abstracts Volume 4**: Unleashing the Language is Inner Magic

In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing short of extraordinary. Within the captivating pages of **Land Use Planning Abstracts Volume 4** a literary masterpiece penned with a renowned author, readers attempt a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book's core themes, assess its distinct writing style, and delve into its lasting effect on the hearts and minds of people who partake in its reading experience.

https://new.webyeshiva.org/results/uploaded-files/default.aspx/At_T_992_Phone_Owners_Manual.pdf

Table of Contents Land Use Planning Abstracts Volume 4

1. Understanding the eBook Land Use Planning Abstracts Volume 4
 - The Rise of Digital Reading Land Use Planning Abstracts Volume 4
 - Advantages of eBooks Over Traditional Books
2. Identifying Land Use Planning Abstracts Volume 4
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Land Use Planning Abstracts Volume 4
 - User-Friendly Interface
4. Exploring eBook Recommendations from Land Use Planning Abstracts Volume 4
 - Personalized Recommendations
 - Land Use Planning Abstracts Volume 4 User Reviews and Ratings
 - Land Use Planning Abstracts Volume 4 and Bestseller Lists

5. Accessing Land Use Planning Abstracts Volume 4 Free and Paid eBooks
 - Land Use Planning Abstracts Volume 4 Public Domain eBooks
 - Land Use Planning Abstracts Volume 4 eBook Subscription Services
 - Land Use Planning Abstracts Volume 4 Budget-Friendly Options
6. Navigating Land Use Planning Abstracts Volume 4 eBook Formats
 - ePUB, PDF, MOBI, and More
 - Land Use Planning Abstracts Volume 4 Compatibility with Devices
 - Land Use Planning Abstracts Volume 4 Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Land Use Planning Abstracts Volume 4
 - Highlighting and Note-Taking Land Use Planning Abstracts Volume 4
 - Interactive Elements Land Use Planning Abstracts Volume 4
8. Staying Engaged with Land Use Planning Abstracts Volume 4
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Land Use Planning Abstracts Volume 4
9. Balancing eBooks and Physical Books Land Use Planning Abstracts Volume 4
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Land Use Planning Abstracts Volume 4
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Land Use Planning Abstracts Volume 4
 - Setting Reading Goals Land Use Planning Abstracts Volume 4
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Land Use Planning Abstracts Volume 4
 - Fact-Checking eBook Content of Land Use Planning Abstracts Volume 4
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

Land Use Planning Abstracts Volume 4 Introduction

In today's digital age, the availability of Land Use Planning Abstracts Volume 4 books and manuals for download has revolutionized the way we access information. Gone are the days of physically flipping through pages and carrying heavy textbooks or manuals. With just a few clicks, we can now access a wealth of knowledge from the comfort of our own homes or on the go. This article will explore the advantages of Land Use Planning Abstracts Volume 4 books and manuals for download, along with some popular platforms that offer these resources. One of the significant advantages of Land Use Planning Abstracts Volume 4 books and manuals for download is the cost-saving aspect. Traditional books and manuals can be costly, especially if you need to purchase several of them for educational or professional purposes. By accessing Land Use Planning Abstracts Volume 4 versions, you eliminate the need to spend money on physical copies. This not only saves you money but also reduces the environmental impact associated with book production and transportation. Furthermore, Land Use Planning Abstracts Volume 4 books and manuals for download are incredibly convenient. With just a computer or smartphone and an internet connection, you can access a vast library of resources on any subject imaginable. Whether you're a student looking for textbooks, a professional seeking industry-specific manuals, or someone interested in self-improvement, these digital resources provide an efficient and accessible means of acquiring knowledge. Moreover, PDF books and manuals offer a range of benefits compared to other digital formats. PDF files are designed to retain their formatting regardless of the device used to open them. This ensures that the content appears exactly as intended by the author, with no loss of formatting or missing graphics. Additionally, PDF files can be easily annotated, bookmarked, and searched for specific terms, making them highly practical for studying or referencing. When it comes to accessing Land Use Planning Abstracts Volume 4 books and manuals, several platforms offer an extensive collection of resources. One such platform is Project Gutenberg, a nonprofit organization that provides over 60,000 free eBooks. These books are primarily in the public domain, meaning they can be freely distributed and downloaded. Project Gutenberg offers a wide range of classic literature, making it an excellent resource for literature enthusiasts. Another popular platform for Land Use Planning Abstracts Volume 4 books and manuals is Open Library. Open Library is an initiative of the Internet Archive, a non-profit organization dedicated to digitizing cultural artifacts and making them accessible to the public. Open Library hosts millions of books, including both public domain works

and contemporary titles. It also allows users to borrow digital copies of certain books for a limited period, similar to a library lending system. Additionally, many universities and educational institutions have their own digital libraries that provide free access to PDF books and manuals. These libraries often offer academic texts, research papers, and technical manuals, making them invaluable resources for students and researchers. Some notable examples include MIT OpenCourseWare, which offers free access to course materials from the Massachusetts Institute of Technology, and the Digital Public Library of America, which provides a vast collection of digitized books and historical documents. In conclusion, Land Use Planning Abstracts Volume 4 books and manuals for download have transformed the way we access information. They provide a cost-effective and convenient means of acquiring knowledge, offering the ability to access a vast library of resources at our fingertips. With platforms like Project Gutenberg, Open Library, and various digital libraries offered by educational institutions, we have access to an ever-expanding collection of books and manuals. Whether for educational, professional, or personal purposes, these digital resources serve as valuable tools for continuous learning and self-improvement. So why not take advantage of the vast world of Land Use Planning Abstracts Volume 4 books and manuals for download and embark on your journey of knowledge?

FAQs About Land Use Planning Abstracts Volume 4 Books

1. Where can I buy Land Use Planning Abstracts Volume 4 books? Bookstores: Physical bookstores like Barnes & Noble, Waterstones, and independent local stores. Online Retailers: Amazon, Book Depository, and various online bookstores offer a wide range of books in physical and digital formats.
2. What are the different book formats available? Hardcover: Sturdy and durable, usually more expensive. Paperback: Cheaper, lighter, and more portable than hardcovers. E-books: Digital books available for e-readers like Kindle or software like Apple Books, Kindle, and Google Play Books.
3. How do I choose a Land Use Planning Abstracts Volume 4 book to read? Genres: Consider the genre you enjoy (fiction, non-fiction, mystery, sci-fi, etc.). Recommendations: Ask friends, join book clubs, or explore online reviews and recommendations. Author: If you like a particular author, you might enjoy more of their work.
4. How do I take care of Land Use Planning Abstracts Volume 4 books? Storage: Keep them away from direct sunlight and in a dry environment. Handling: Avoid folding pages, use bookmarks, and handle them with clean hands. Cleaning: Gently dust the covers and pages occasionally.
5. Can I borrow books without buying them? Public Libraries: Local libraries offer a wide range of books for borrowing.

Book Swaps: Community book exchanges or online platforms where people exchange books.

6. How can I track my reading progress or manage my book collection? Book Tracking Apps: Goodreads, LibraryThing, and Book Catalogue are popular apps for tracking your reading progress and managing book collections. Spreadsheets: You can create your own spreadsheet to track books read, ratings, and other details.

7. What are Land Use Planning Abstracts Volume 4 audiobooks, and where can I find them? Audiobooks: Audio recordings of books, perfect for listening while commuting or multitasking. Platforms: Audible, LibriVox, and Google Play Books offer a wide selection of audiobooks.

8. How do I support authors or the book industry? Buy Books: Purchase books from authors or independent bookstores. Reviews: Leave reviews on platforms like Goodreads or Amazon. Promotion: Share your favorite books on social media or recommend them to friends.

9. Are there book clubs or reading communities I can join? Local Clubs: Check for local book clubs in libraries or community centers. Online Communities: Platforms like Goodreads have virtual book clubs and discussion groups.

10. Can I read Land Use Planning Abstracts Volume 4 books for free? Public Domain Books: Many classic books are available for free as they're in the public domain. Free E-books: Some websites offer free e-books legally, like Project Gutenberg or Open Library.

Find Land Use Planning Abstracts Volume 4 :

at t 992 phone owners manual

ecological studies volume 17 analysis and synthesis fennoscandian tundra ecosystems part 2 animals and systems analysis

business studies september exam grade 12 2014

b737 fmc users guide

takeuchi tb045 manual

lodysseacutee dhomegravere questionnaire de lecture

modern biology study guide answer key 9

distributive property game

question paper 2 november 2014 physical science

zoology question hsc 2013 dhaka board

b737 pilot guide handbook

honey and junk

[1999 yamaha banshee 350 service manual](#)

saturn service light on

2006 acura tl egr valve gasket manual

Land Use Planning Abstracts Volume 4 :

Drugs & Society by Hanson, Glen R. Drugs and Society ; Clean: Overcoming Addiction and Ending America's Greatest Tragedy. Drugs and Society: 9781284110876 Drugs and Society, Thirteenth Edition is written on a personal level and directly addresses college students by incorporating individual drug use and abuse ... Drugs & Society: 9781284197853 As a long-standing, reliable resource Drugs & Society, Fourteenth Edition ... Glen R. Hanson, PhD, DDS; Peter J. Venturelli, PhD; Annette E. Fleckenstein ... Drugs and Society Drugs and Society. Front Cover. Glen R. Hanson, Peter J. Venturelli, Annette E. Fleckenstein. Jones & Bartlett Learning, 2006 - Drug abuse - 587 pages. Drugs ... Glen R. Hanson; Peter J. Venturelli; Annette E. Fleckenstein Chapter 1 Introduction to Drugs and Society ; Chapter 2 Explaining Drug Use and Abuse ; Chapter 3 Drug Use, Regulation, and the Law ; Chapter 4 Homeostatic Systems ... Drugs & Society - Glen R. Hanson, Peter J. Venturelli ... Drugs & Society. Authors, Glen R. Hanson, Peter J. Venturelli, Annette E. Fleckenstein. Edition, 14. Publisher, Jones & Bartlett Learning, 2020. ISBN ... Drugs and Society 13th edition 9781284110876 Drugs and Society 13th Edition is written by Glen R. Hanson and published by Jones & Bartlett Learning. The Digital and eTextbook ISBNs for Drugs and ... Drugs And Society by Glen R. Hanson The Tenth Edition of Drugs and Society clearly illustrates the impact of drug use and abuse on the lives of ordinary people and provides students with a ... Drugs & Society 14th edition 9781284197853 1284197859 Rent Drugs & Society 14th edition (978-1284197853) today, or search our site for other textbooks by Glen Hanson. Every textbook comes with a 21-day "Any ... Drugs and Society (Hanson, Drugs and Society) If you liked Drugs and Society (Hanson, Drugs and Society) you may also like: 12 Steps for Birth Parent Grief: navigating the adoption grief process. John 'Chow' Hayes John Frederick "Chow" Hayes (7 September 1911 – 7 May 1993) was an Australian criminal who became known as Australia's first gangster. Chow Hayes: Australia's Most Notorious Gangster Oct 16, 2017 — This was a really good book which I enjoyed thoroughly. What I liked best is that at no time did Hickie attempt to glamourize Hayes or his ... Chow Hayes gunman by David Hickie Read 2 reviews from the world's largest community for readers. undefined. Chow Hayes, Gunman by David Hickie (9780207160127) The title of this book is Chow Hayes, Gunman and it was written by David Hickie. This particular edition is in a Paperback format. This books publish date is ... Customer reviews: Chow Hayes gunman Find helpful customer reviews and review ratings for Chow Hayes gunman at Amazon.com. Read honest and unbiased product reviews from our users. 29 May 1952 - "CHOW" HAYES SENTENCED TO DEATH SYDNEY, Wednesday: John Frederick "Chow" Hayes, 39, laborer, was sentenced to death at Central Criminal Court today for the murder of William John Lee, ... Chow Hayes,

Gunman: Australia's most notorious gangster ... Hayes was one of Sydney's top standover men during the 1930s, 40s and 50s, and killed a number of other criminals. For three years Hickie visited Hayes once a ... Chow Hayes | Sydney's Criminal Underworld - YouTube Chow Hayes-Gunman - David Hickie Biography of TChow' Hayes, a notorious Sydney criminal figure and standover man of the 30s, 40s and 50s. Hayes gave the author full co-operation in telling ... Italy Travel Guide by Rick Steves Explore Italy! Get inspired with Rick Steves' recommended places to go and things to do, with tips, photos, videos, and travel information on Italy. Italy Tours & Vacations 2023 & 2024 Rick Steves Italy tours provide the best value for your trip to Europe. Our stress-free Italy vacations package together small groups, great guides, central ... Italy Guidebook for 2024 - Rick Steves Travel Store Rick's picks for sights, eating, sleeping; In-depth coverage of our favorite Italian destinations; Great self-guided neighborhood walks and museum tours ... One week in Italy - Rick Steves Travel Forum Jun 14, 2018 — Rome is amazing, but it will be hot. Our absolute favorite place in Italy is Lake Como---particularly Varenna. We also loved the Amalfi Coast, ... Italy's Amalfi Coast - Video - Rick Steves' Europe Advice on Italy Travel Plan - Rick Steves Travel Forum Jul 22, 2023 — In planning a trip, it helps to pick the exact specific museums and monuments you will see and what you will acquiesce to skipping. Then you ... Italy Itinerary Rick's Best Three-Week Trip to Italy. The big-ticket stops in Italy — Venice, the Cinque Terre, Florence, Rome, and the cluster south of Rome (Sorrento/Naples/ ... Rick Steves Italy (Travel Guide) This guide gives you an overview together with every little thing you need for planning a trip. How many days, transportation, hotels, restaurants, sights, ...