

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 6282, Makkah 21555, Saudi Arabia; essamibrahim@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/app13031749>

Academic Editor: Jianbo 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 (<https://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

TD Snyder



Land Use Planning Abstracts Volume 4:

Energy Abstracts for Policy Analysis ,1980 *Land Use Planning Abstracts* ,1975 **U.S. Government Research & Development Reports** ,1971 **Urban Mass Transportation Abstracts** ,1982 **Scientific and Technical Aerospace Reports** ,1979 *EPA Publications Bibliography Quarterly Abstract Bulletin* United States. Environmental Protection Agency,1996-10 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 Library Searching Jacquelyn M. Morris,Elizabeth A. Elkins,1978 *Transportation... Weekly Government Abstracts* ,1976 **Government reports annual index** ,199? **Behavior & Society** ,1979 **EIS Cumulative** ,1998 *Government Reports Announcements & Index* ,1978 *U.S. Government Research & Development Reports* ,1971 Energy Research Abstracts ,1993-02 *HRIS Abstracts* ,1988 **Index of Conference Proceedings** British Library. Document Supply Centre,2001 Urban & Regional Technology & Development ,1982 **Ecology Abstracts** ,1983 *Civil Engineering Hydraulics Abstracts* ,1984

Immerse yourself in heartwarming tales of love and emotion with Crafted by is touching creation, Tender Moments: **Land Use Planning Abstracts Volume 4** . This emotionally charged ebook, available for download in a PDF format (Download in PDF: *), is a celebration of love in all its forms. Download now and let the warmth of these stories envelop your heart.

https://netdata.businessstraveller.com/About/virtual-library/Documents/zenith_xbv343_dvd_vcr_combo_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

Land Use Planning Abstracts Volume 4 Offers over 60,000 free eBooks, including many classics that are in the public domain. Open Library: Provides access to over 1 million free eBooks, including classic literature and contemporary works. Land Use Planning Abstracts Volume 4 Offers a vast collection of books, some of which are available for free as PDF downloads, particularly older books in the public domain. Land Use Planning Abstracts Volume 4 : This website hosts a vast collection of scientific articles, books, and textbooks. While it operates in a legal gray area due to copyright issues, its a popular resource for finding various publications. Internet Archive for Land Use Planning Abstracts Volume 4 : Has an extensive collection of digital content, including books, articles, videos, and more. It has a massive library of free downloadable books. Free-eBooks Land Use Planning Abstracts Volume 4 Offers a diverse range of free eBooks across various genres. Land Use Planning Abstracts Volume 4 Focuses mainly on educational books, textbooks, and business books. It offers free PDF downloads for educational purposes. Land Use Planning Abstracts Volume 4 Provides a large selection of free eBooks in different genres, which are available for download in various formats, including PDF. Finding specific Land Use Planning Abstracts Volume 4, especially related to Land Use Planning Abstracts Volume 4, might be challenging as theyre often artistic creations rather than practical blueprints. However, you can explore the following steps to search for or create your own Online Searches: Look for websites, forums, or blogs dedicated to Land Use Planning Abstracts Volume 4, Sometimes enthusiasts share their designs or concepts in PDF format. Books and Magazines Some Land Use Planning Abstracts Volume 4 books or magazines might include. Look for these in online stores or libraries. Remember that while Land Use Planning Abstracts Volume 4, sharing copyrighted material without permission is not legal. Always ensure youre either creating your own or obtaining them from legitimate sources that allow sharing and downloading. Library Check if your local library offers eBook lending services. Many libraries have digital catalogs where you can borrow Land Use Planning Abstracts Volume 4 eBooks for free, including popular titles. Online Retailers: Websites like Amazon, Google Books, or Apple Books often sell eBooks. Sometimes, authors or publishers offer promotions or free periods for certain books. Authors Website Occasionally, authors provide excerpts or short stories for free on their websites. While this might not be the Land Use Planning Abstracts Volume 4 full book , it can give you a taste of the authors writing style. Subscription Services Platforms like Kindle Unlimited or Scribd offer subscription-based access to a wide range of Land Use Planning Abstracts Volume 4 eBooks, including some popular titles.

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 :

~~zenith xbv343 dvd ver combo manual~~

~~2003 dodge dakota manual transmission fluid~~

~~earth science guided study workbook answers 6~~

~~ingersoll 4016 maintenance manual~~

~~stand strong vbs bible verses powerpoint~~

~~manual bombardier fsx~~

question paper 2 of agric grade 12014

~~interests of the voiceless far east~~

~~sell soup recipe price~~

~~meteorology lab manual~~

~~improvement guide a practical approach to enhancing organizational performance~~

~~00 blazer ac wiring digram~~

essentials word 2002 level 3

quizlet anatomy and physiology chapter 4

~~the banner campaign banners and its positive sides~~

Land Use Planning Abstracts Volume 4 :

Thou art god vocal score [PDF] thou art god vocal score. 2011-11-13. 13/15 thou art god vocal score. The Voice in the Paint. 2023-04-25. Gideon, an oratorio. [Vocal score.] 1875. Unexpected ... Thou art God (High Solo) by Lionel Bou Buy Thou art God (High Solo) by Lionel Bou at jwpepper.com. Piano/Vocal Sheet Music. Thou Art God (SATB) by BECK Buy Thou Art God (SATB) by BECK at jwpepper.com. Choral Sheet Music. Thou art God (solo/high) - Lionel Bourne An easy anthem for high voice and piano or organ, this piece has a haunting simplicity with a flowing tune over a gently rocking accompaniment. Thou art God - Lionel Bourne Thou art God. High voice vocal score. Lionel Bourne. An easy anthem for high voice and piano or organ, this piece has a haunting simplicity with a flowing tune ... Stainer, John - Lord, Thou Art God (Vocal Score) Sheet Music - £3.50 - Stainer, John - Lord, Thou Art God (Vocal Score) Thou art God - Choir An easy anthem for upper voices with organ, plus optional flute and oboe. The music has a haunting simplicity with a flowing tune over a gently rocking ... Thou art God: 9780193511576: Musical Instruments Thou art God, An easy anthem for upper voices with organ, plus optional flute and oboe. The music has a haunting simplicity with a flowing tune over a ... Thou Art God John Ness Beck Choral Sheet Music

... Thou Art God John Ness Beck Choral Sheet Music Church Choir Octavo FD9 2886 ; Quantity. 2 available ; Item Number. 295954232800 ; Format. Piano Score, Sheet Music, ... HVAC Formulas - Calculations for the HVAC Industry in 2020 Jun 25, 2020 — HVAC Formulas - A Quick and Handy Guide for Common HVAC Calculation ... Encourage your employees to print this out to use as a cheat sheet, or ... HVAC Formulas.pdf CONVERTING BTU to KW: 3413 BTU's = 1 KW. Example: A 100,000 BTU/hr. oil or gas furnace. $(100,000 \div 3413 = 29.3 \text{ KW})$. COULOMB = 6.24×10^{18} . HVAC Formulas - TABB Certified HVAC Formulas · Air Flow Formulas · Motor Formulas · Equivalents Formulas · Hydronic Formulas · Cooling Towers Formulas. HVAC - Practical Basic Calculations PRACTICAL HVAC CALCULATION EXAMPLE: Calculate the U-values and heat losses in a building with the following data: Given: Dry-bulb temperature ... Hvac formulas | PDF Nov 25, 2018 — HVAC FORMULAS TON OF REFRIGERATION - The amount of heat required to melt a ton (· VA (how the secondary of a transformer is rated) = volts X ... Equations, Data, and Rules of Thumb The heating, ventilation, and air conditioning (HVAC) equations, data, rules of thumb, and other information contained within this reference manual were ... 8 HVAC/R cheat sheets ideas Aug 18, 2020 - Explore James's board "HVAC/R cheat sheets" on Pinterest. See more ideas about hvac, hvac air conditioning, refrigeration and air ... Hvac Formulas PDF | PDF | Propane | Combustion TON OF REFRIGERATION The amount of heat required to melt a ton (2000 lbs.) of ice at 32F 288,000 BTU/24 hr. 12,000 BTU/hr. APPROXIMATELY 2 inches in Hg. HVAC Formulas: A Complete Guide Oct 24, 2022 — How is HVAC capacity calculated? · Divide the sq ft of the house by 500. · Then multiply the number by 12,000 BTUs. · Now calculate the heat ... Amazon.com: Astrology/Karma & Transformation 2nd Ed This insightful and original book focuses on the understanding and use of astrology as a tool for spiritual and psychological growth. Astrology, Karma & Transformation: The Inner Dimensions ... This book takes a positive, helpful view of the topic of karma as it can be understood through astrology. There is a particular focus on the outer planets, ... Astrology, Karma & Transformation: The Inner Dimensions ... Jan 1, 1978 — This insightful and original book focuses on the understanding and use of astrology as a tool for spiritual and psychological growth. Astrology, Karma & Transformation by Stephen Arroyo, Pacia ... The chart shows what we are now because of what we have thought and done in the past. These age-old, deeply-entrenched patterns are not easily changed. Let this ... Astrology, Karma and Transformation: The Inner ... Astrology, Karma and Transformation: The Inner Dimensions of the Birth Chart by Arroyo, Stephen - ISBN 10: 0916360032 - ISBN 13: 9780916360030 - CRCS ... Astrology/Karma & Transformation 2nd Ed This insightful and original book focuses on the understanding and use of astrology as a tool for spiritual and psychological growth. Astrology, Karma & Transformation: The Inner Dimensions ... This insightful and original book focuses on the understanding and use of astrology as a tool for spiritual and psychological growth. Stephen Arroyo Astrology/Karma & Transformation 2nd Ed Stephen Arroyo (born October 6, 1946 in Kansas City, Missouri) is an American author and astrologer. Arroyo has written seven books on psychologically ... Astrology/Karma & Transformation 2nd Ed (Paperback) Nov 1, 1992 — This insightful and original book

focuses on the understanding and use of astrology as a tool for spiritual and psychological growth. In ... Astrology, Karma & Transformation: The Inner Dimensions ... Arroyo has written seven books on psychologically oriented astrology which outline his theory that the individual's experience of the Solar System's impacts on ...