Site Analysis and Planning

Lecture 9

Welcome to UGC lecture series, today's topic is Site Analysis and Planning. Subject code - AR 6512. Unit 3 - Site Analysis, Lecture - 09.

This is the final lecture for unit 3, presentation outline. Presentation has been divided into three categories - Introduction, Governing factors for site planning and Process and elements for site analysis.

Influencing factors govern sitting in a given site - Each project has a different set of requirements, limitations, challenges and opportunities that affect a project's cultural, environmental, technological and aesthetic contexts. Since each site has a unique feature and it is not the same that has been replicated throughout. You need to understand each site separately in order to address its aesthetic, cultural, technological, environmental factors to give better results to the chosen site. The same solution cannot be adopted someplace else because the solutions that are given for one particular site will not be completely useful for another site. Each and every site has to be addressed individually. The factors represented below are among the most influential -

Client, client is the one who comes with the project and he defines what he wants to do with the project and second is the program. Client or the architect helps the client in choosing what type of function, what type of building, how many uses and where is it used, during which time, everything comes under the program. This is created either by the client directly or with the help of architecture.

Community concerns - it caters to the need of the neighbourhood and the different communities that are going to come into the site and all their needs comes under community concerns. Codes and regulations - these are bi-laws and restrictions, FIRs, zoning, land use pattern; everything comes under codes and regulations. Next is Context and Climate - context and climate is very essential and a very vital element in site planning. It takes into account different types of climatic conditions and type of design solutions that will be proposed to the site and site as such. You need to know where is the site located, how far is it located from main roads, what special features it has, terrain, topography, etc and building technology. Building technology comes with what the client chooses if the building is going to use state-of-the-art building technology; all these are chosen by the client and the amount of investment he is going to make into the project. Next is Sustainability. Since sustainability is becoming very vital and essential in each and every planning aspect of architecture. Sustainability as such is a very important part or an important element for making a very good sustainable site plan. Cost,

even though we might perceive a lot of different viewpoints, a lot of fancy solutions for a given project, there is always a cost to which it has to be addressed. The cost is usually derived at a very initial stage of design and very a detailed estimate is made by the architect, after approval of the client, this cost has to be considered when making any changes in the design or advancing any type of technology which is going to be given into the site. Schedule, since there might be infinite number of changes that happens on the site and site drawings, there is usually a schedule or a timeframe within which we need to work, else the project will become indefinite and the construction will happen for more than what is expected or what is supposed to happen.

Client - Some clients have a clear idea of a program, budget, and other project objectives, including the final appearance of the building. There might be some clients who have envisioned the project completely from scratch. For example, he might know what type of program are they going to build, how much cost are they going to invest as well as how it is going to look at the very last stage. That is completely the client's imagination. Others look to their architect to help them define the project objectives and to design a building that meets those objectives. When a client is not very sure about what to construct on the site, he can sit with the architect and he can explain the whole set of ideas he has on his mind so that architects can help him refine the whole idea into a much more clearer program under which they can proceed with the project. In both cases, the effectiveness of the relationship between the client and architect is a major factor in making and implementing design decisions throughout the project. Even if the client is well-educated or not so educated, there must be a rapport between the client and the architect so that they can work together throughout the project until it begins to be used.

Program - all clients have a series of aspirations, requirements and limitations to be met in design. The program provides a place for identifying and delineating these factors and any number of related considerations. The program may be short or long, general or specific, descriptive of needs or suggestive of solutions. Usually client comes up with a design proposal, he states what he wants. Say for example, the client's vision might be to build a shopping complex which might have 5 number of large shops, 15 number of small shops and 20 number of medium shops; when he comes with this type of a proposal, he might tell large shops must be a 1000 sq ft, while medium shops should be 500 sq ft and the small shops can be 250 sq ft. The role of architect is to understand the relationship between everything and different services that might be put into the project and that might increase the program completely. For example, these shops will require walking, circulation path, toilet facilities, fire extinguishing spaces and staircases, handicapped access entrance; all this detailed program is created by the architect and it also works towards the favour of the client.

Community concerns - Clients and their architects must adjust their designs to satisfy community groups, neighbours, and public officials. When you are going to build something, when it is going to be used by one or more users, it is going definitely create an impact on the people who are surrounding it. We need to be sensitive to the community that is going to surround it and the people who are going to use the project, this falls under community concerns. These design adjustments are often ad hoc efforts to meet objections or to gain support rather than direct responses to codified requirements. When you make design adjustments, when there is some problem on your site because of your proposal, the neighbours will get affected and you can always revise your design so that the objection is reduced and you can still proceed with the project.

Codes and regulations - Regulatory constraints on design have increased steadily. Beginning with simple safety requirements and minimal land-use and light-and-air zoning, building codes and regulations have grown into a major force in design that regulates every aspect of design and construction. Over the years we have always been revising not only our design and architecture but even our policies, quotes and regulations have been revised constantly so that there is a much more detailed version of quotes and regulations developed, this has to be met by a new design. Say for example, there are a lot of buildings that have to use electricity less than a certain amount of kwh, you have to make sure your building uses electricity less than this amount of electricity. This has been proposed in order to save the fuel. This place even for usage of LED lights or reduction in fuel consumption or reduction in air conditioning systems, all this falls under quotes and regulations.

Context and climate - Contextual factors include the nature of the surrounding fabric of natural and built elements. Existing patterns and characteristics of this fabric can provide clues or starting points for approaching site development as well as the building, design, influencing its configuration and use of materials, colors, and textures. Depending on where your project is going to be situated at and at what type of climate the site has overall throughout the year has to be studied. Also the microclimate of the particular site in which the final design is going to happen has to be studied completely in order to choose not only zoning of your spaces but it also helps in choosing what type of material texture and colour of the material has to be used for the finish of your building. Climatic factors include the nature of regional microclimates defined by solar radiation, temperatures, humidity, wind and precipitation.

Site - These factors include site size; configuration, topography; geotechnical characteristics, ecological features, including vegetation, wildlife habitats, water elements and drainage, and accessibility to property. When you are designing something on your site, you need to

understand not only about surrounding spaces and surrounding concerns but also about the site, how your land is being photographed and what is the gradient percentage of your site and where your actual water table is present and where the water table is very high so that you can locate your bore points, from where your water can be taken and distributed to the different parts of the site. All this can be designed only if you have a thorough understanding and knowledge about the site.

Building Technology - Building configuration, materials, and systems are rarely arbitrarily chosen and are only partially based on aesthetic criteria. Usually there is a specific need for which you are going to choose the type of technology you are going to use. For example, if you need to monitor your building completely, we go in for cctv cameras. It is a very straightforward approach, it cannot be arbitrarily chosen which means it cannot be randomly chosen, it has to address a specific problem under only partially aesthetic criteria. When you are going in for building technology, it is mainly to address various factors; aesthetic aspect is not the main concern for building technology. For example, floor-to-floor height required to accommodate structural, mechanical, lighting, and ceiling systems in a cost effective manner varies significantly from an apartment house to an office building to a research facility. Depending upon what type of space it is going to be, the amount you spend on building technology also differs completely. If it is for a residence, you might not need cctv cameras or various technologies that you are going to put into your design as much as how much you might need at office space or for a laboratory to function safely. Similarly, office fenestration may be based on one module and housing on another module. For example, if you are going to create an opening in an office space, usually we see the same size of opening that is being repeated throughout the building but the same cannot be adopted for a residence because it might question the whole privacy factor of the residents who are going to use it. Those type of fenestrations will be completely different. What they are trying to state is, all this building technology depends on what type of use this building is going to address. In still other cases, these dimensions may be dictated largely by mechanical systems or even by the knowledge and preferences of the local construction industry. It might also depend upon the mechanical systems that are going to go into your design/ project. For example, if you are going to keep an air conditioned room, there might be windows that allow natural ventilation but you don't need windows more than that to take in natural air from outside because the building or space is already going to be completely air conditioned. You need to know each aspect of each room, what is the function of the room and what type of technology must be integrated within. Then it also has to kept within the budget which is derived at the initial program by that line.

Sustainability - In its broadest scope, sustainability refers to the ability of a society, ecosystem or any such ongoing system to continue functioning into the future without being forced into

decline through exhaustion or overloading of the key resources on which that system depends. Sustainability as we all know is process of providing resources that are sufficient for the present, keeping in mind the needs of the future as well. There has to be a balance in the usage of resources, usage of materials, so that we don't reduce or overdo what we need in the present also we keep something left over for the future to use it or we find some alternative solutions in the future to continue the whole process. For architecture, this means design that delivers buildings and communities with lower environmental impacts while enhancing health, productivity, community and quality of life. When you are addressing sustainability for architecture, it means we are addressing various issues for the end user. We need to make sure the user's health is maintained amidst the amount of air exchange that is being provided within or the amount of lighting that is going to fall within. All this affects the health of the user directly. Also, the amount of dust and noise that is going to come inside, which is going to reduce the user's productivity. It also needs to address not just the one user but also needs to address the community as well as to improve the overall quality of life.

Cost - in most cases, there is a limit to the funds available for construction. Once defined, this limit has a major influence on subsequent design decisions, from building size and configuration to material selection and detailing. Once when we make a detailed estimate of the whole project, we need to work within the cost that is being estimated. Usually it cannot be an arbitrarily chosen figure, it has to be calculated at the very initial stage so that the client is prepared for the cost that he is going to invest in the whole project so that as architects or designers, we work along with the cost factor that is being derived by the client. Although, most budgets are fixed (often by the amount of financing available) others may be flexible. Usually it depends on how much money the client has in hand but there are some cases in which the client may go in for a loan in which case there are much more flexible options of costing factor. The cost might increase to 10% or might reduce considerably, compared to what we calculated initially. This is flexible plan or it keeps fluctuating depending upon the client's condition. For example, some owners are willing to increase initial budgets to achieve overall life-cycle cost savings which means, as architects we might suggest clients to use LED lamps even though the initial investment cost is almost three times the conventional light, overall, when you look at the life cycle or the electricity bills, you will regain the amount eventually in a few years. This has to be explained in detail to the client in order for him to invest the excess cost in the project. Next is Schedule.

Schedule - the demands and constraints set by the project schedule may influence how specific issues are explored and considered. For example, an alternative requiring a time-consuming zoning variance may be discarded in favour of one that can keep the project on schedule. Say for example, if you are starting the construction of a residence and the client wants to finish it

within 6 months, we need to prepare a construction management process in which the number of days to be taken for each process is mentioned. Whereas, when there is a process that is going to get prolonged, the masons can be involved in some other space of the same building or the same site so that the masons are also occupied while the site shows constant progress throughout the time period and we are also able to finish within the framework that was estimated initially.

Techniques of Site analysis - Site analysis is a preliminary phase of architectural and urban design processes dedicated to the study of the climatic, geographical, historical, legal and infrastructural context of a specific site. Site analysis is not just an architectural or graphical representation, it takes in a lot of technical aspects, it takes into account climate, content, geography, history as well as legal, infrastructural, codes and regulation that has been used in the site to make a proper site plan. The result of this analytic process is a summary, usually a graphical sketch, which sets in relation the relevant environmental information with the morphology of the site in terms of parcel, topography and built environment. As we analyze, we are able to gather a much more clearer understanding of the site which will already give us information about where the building can be ideally located and what type of drainage system can be provided and how services can flow from outside to inside, how waste can be disposed from outside to inside, all this information will get clearer once you make a proper site analysis. This result is then used as a starting point for the development of environment-related strategies during the design process. Once you understand about the whole site analysis, this will help you in creating environmental related strategy. For example, when we know how the find is going to come through, it is possible for us to avoid the wind if necessary or use the wind beneficially to get the hot air outside. This comes only after you prepare a proper site analysis.

A number of graphical tools for site analysis has been developed to assist designers in this task. There are a lot of graphical tools already present, which means there are a lot of tools with which you can measure the climate, temperature, relative humidity, surface temperature of different places on your site so that you get a clear understanding of micro climate even though the overall climate for one year can be studied easily from other departments, government departments, which have been observing the yearly performance, there might be slight change from the actual site condition. Such aspects can be studied using those type of tools. It helps architects make much more accurate site analysis.

Examples of traditional climate-related site analysis tools are the Sundial, the Sun Path Diagram, the Radiation Square, the Wind Rose and the Wind Square. These are the different tools that are used of site analysis, this shows how the sun revolves around the site, where the

shadows are cast, during what time and different seasons, how much wind is flowing into the site and how it is going to go out. All these aspects are very important while making a site analysis. These conventional methods of site analysis are efficient in simple sites with irrelevant close obstructions, where the analysis can be reduced to the parcel at the ground level or even exclusively to its center point. These conventional methods of analysis, varies from site to site. When you are having a site that has a lot of constraint, this constraint reduces a lot of opportunities or design advantages, this whole site analysis for such type of site can be confined to the centre point. Centre point might have very less number of obstructions, that can be taken as the best case, that point can be analyzed and can be used for the entire site. More elaborate techniques like Volumetric site analysis can instead be used to study more intricate and obstructed sites, like those of high and dense urban settings.

When you have a small parcel of land in a very high dense development, the site that you are going to do might not make much sense, for that type of a site, you can opt for volumetric site analysis which takes into account also the height of the site. In the ground level, even though there is a lot of obstruction, you can go for volumetric site analysis, which will give you chances to create opportunities to make a better site planning and better understanding of the whole parcel of land.

Process as described by Edward T.White the site design process is divided up into three sections; research phase, analysis phase, and synthesis phase. These three phases are divided into the eight chronological steps in the design process.

Research phase - the first step is defining the problem and its definition. This is the part of the research phase. The site design and site planning process begins with the initial problem to be solved. This is to be started by the client contracting a planner to work with a particular site. The research phase includes the first information you gather about the site, what type of project, what type of functions it's going to cater to. All this comes from the client and it is being synthesised along with the site and then you need to arrive at what the clients wants and what can be done with the site.

Analysis Phase - the next step involves programming the site as well as the site and user analysis, which is focused on in-depth below. There are numerous site elements related to the analysis during this phase. This is the part of the analysis phase in site planning. When you are doing analysis, you need to take into account zoning, noise, traffic, utility on site features, drainage, neighbourhood pattern, location contours, shape views, boundaries, climate, setbacks. All these are external information that go into making a site analysis better. This

information has to be gathered beforehand so that the architect has all the information that he needed. The architect can even change his whole vision of the project.

Let's summarize what we have learnt from this entire presentation as learning outcomes. Detail discussions about various governing factors and elements for site planning/ design. Various process involved in site analysis - research, analyze and synthesis. Various elements governing site analysis as explained by Ed-white.

Questions - What are the various governing factors for a site plan? Explain the main influence of cost and schedule. What is site analysis and explain its detailed process? What are the elements that influence site analysis? Explain the influence of climate and neighbourhood context in site analysis. Thank you!