INTRODUCTION

The goal of this paper is to give an overview of the lighting design process, with an understanding of the process when working with Light Plan Design. Over the years, we have found that the basic guidelines were evolving to include our personal touch. We have developed a deep understanding of the overall design process, starting with theatrical design studies dating back into the latter half of the last century. We treat each project as if it we were bringing the project to life through lighting.

The standard lighting design process is usually broken down into these general categories:

1) Information Gathering, which involves identifying the lighting requirements.
2) Schematic Design Phase, which would involve the conceptualization of lighting the environment.
3) Design Development Phase, choice of luminaires, locating, developing details, and control systems.
4) Construction Documents Phase, lighting calculations, finalize lighting details and adjust the design.
5) Construction Administration Phase, respond to field/installation questions, review lighting submittals and any substitutions, and inspect the installation and aiming of the fixtures.

With LPD the Architect has an added benefit. We, at LPD, work on the Schematic Phase in our office with no influence from the Design Team. We aim to give the Architect our uninhibited, creative, emotional take on the building.

BEFORE INFORMATION GATHERING OR BEFORE SCHEMATIC DESIGN

Inspiration
from the Latin inspirare, meaning "to breathe into"
the process of being mentally stimulated to do
or feel something, especially to do something creative

To breathe life into…to bring life to the building. This is our approach to our design technique. We find inspiration within the design, what emotions are enticed looking at the design, we cherish mentally walking through each space, seeing each architectural detail and feature, all within the architectural context of the building and the site.

We begin our design process by studying the architecture before any meetings with the Design Team. We study the drawings and imagine ourselves entering the space for the first time, as a person entering the building for the first time.

We know that most occupants of the building will not know any of the reasoning behind the design decisions. However, the lighting will help reinforce the design for anyone experiencing it. For example: There was a restaurant which had a high turnover rate of customers, yet was always busy. After having cocktails and appetizers, we discovered why - there was no focus. There was only ambient lighting, leaving the guests feeling lost and uninspired by the design of the restaurant. Proper accent lighting would have made the interiors interesting and dynamic, giving the customers a reason and a desire to come back.

LPD looks at the project as a blank canvas ready to be painted by our lighting. A splash of color here or a highlight there or possibly a darkening of the shadows. These features will add to the uniqueness of the building or space, creating intrigue and interest. We love to make the architectural features come to life with different shades of whites or different colors. We are also mindful of the shadows, which play a big role in creating interest and excitement.

SCHEMATIC DESIGN / INFORMATION GATHERING PHASE - MEETING WITH THE ARCHITECTURAL TEAM

At the first meeting with the Architectural Team we first listen to the Design Team's inspiration and vision of the project. It is critical to integrate this vision into our design concepts. Then we present our ideas, our concept, and our inspiration for the lighting. We take the Architect on a 'tour' of our ideas to bring the architectural features to life. Most Architects are very receptive to this approach. It gives them a new outlook of the building. These meetings typically include design charrettes with the energy, ideas being tossed around. This approach is so very exciting and fun, resulting in the best ideas for the Client and the project.

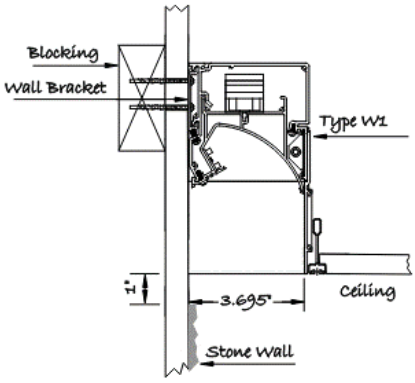
Example of LPD's vision of the exterior of a building, indicating LPD overall vision.

During this initial meeting, we gain an understanding of the overall design, the concepts and the driving force behind the Architects design. Sometimes the Architects design vision can be influenced by other 'forces'. They might be working with an existing building – renovating and/or restoring it. The Owner might have strong ideas of the design 'look'. The usage of the space might also steer the design or financial concerns could play a major role in the design process. You get a window into the Architects' process to get to the finished design. We have all worked on the most amazing designs only have it VE'd to death. By paying attention to the budget throughout the design process, these disappointments can be avoided. Budget control is a major focus of the design work at Light Plan Design.

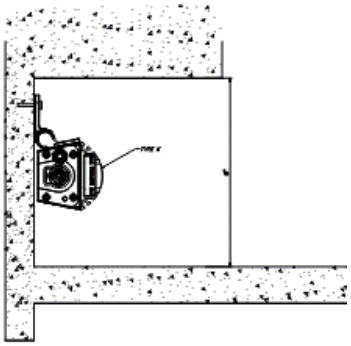
After we walk through the design history and have a clear understanding of what we all perceive of the building, we can cover the more technical aspects. We review the issues surrounding the usage and needs of the building occupants. We review the lighting level requirements and the codes covering the building location. Some Architectural Firms will engage a code advisor on larger projects, which provides very useful information impacting the lighting design. Another important impact is if the project is applying for LEED™ certification and what level.

The Design Team will then get into the details of the project, i.e. possibilities for lighting locations, overall lighting appearance and style of lighting fixtures. At this point we provide our input that the lighting should be discreet, should not be a primary feature within the space. The only lighting feature that should pronounced is the decorative fixtures, which are like the jewelry of the building. We discuss accent points, artwork locations, and in what areas we will concentrate the budget. We also discuss the potential sacrificial lambs or sacred cows for the project. LPD finds that if we provide additional style, quantity, and cost of fixtures that we are willing to change, we can have something to offer to avoid the VE pain later. We then have some areas that we are 'willing' to change either fixture or manufacturers, if we can maintain the fixtures and concepts we truly love, need or want to make the design aesthetically pleasing.

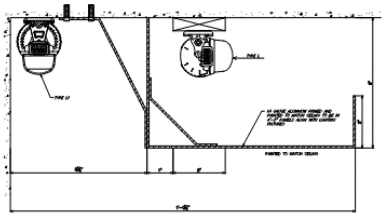
We then review the lighting locations that might require minor architectural changes. Coves, wall grazing, wall-washers or track lighting are examples.



This is an example of a wall grazer, which would require some architectural changes.



LED Colored changing grazing floor.



LED Colored changing grazing wall and ceiling.

Daylighting is also reviewed and the incorporation of fenestration shading controls linked to the daylighting controls system can be added where appropriate.

Our next item to discuss would be the controls. We review the general control style for each space (appearance of wall device/ceiling mounted) and each major public area. In many cases, programming will not only effect the controls but also the lighting design.

Before adjourning the meeting, the moment all Designers dread…. We discuss the budget! One of the most important points of the budget is whether the lighting budget includes installation. The installation cost varies greatly from location to location in the country. A good rule-of-thumb: the installation cost is 1-½ to 2 times the cost of the lighting package. We work with the Architect to come to a thorough understanding and an agreement on the lighting fixture budget.

It is very important to cover all budget agreements in writing. A lighting projected cost is shared with the Design Team. A record of the budget price agreement is important since during the pricing of the job the VE process often looks to cut lighting first. The lighting projected cost from the Lighting Designer can be used to validate the bid pricing and avoid unnecessary cuts to the lighting design.

FACILITY MANAGER – ADDITIONAL FACT GATHERING

Large projects or existing building complexes being renovated/rebuilt will usually have a Facilities Manager. It is critical to sit down with the Facilities Manager to discuss their views on lighting manufacturers, dimming systems and how they feel it is best to control the overall building. It's important since once the Owner takes occupancy of the building the Facility Manager has to deal with all issues. He needs to be comfortable with the products utilized and have buy-in on the decisions made during design. For the controls, LPD discusses with the Facilities Manager his overall view of the entire facility, as well

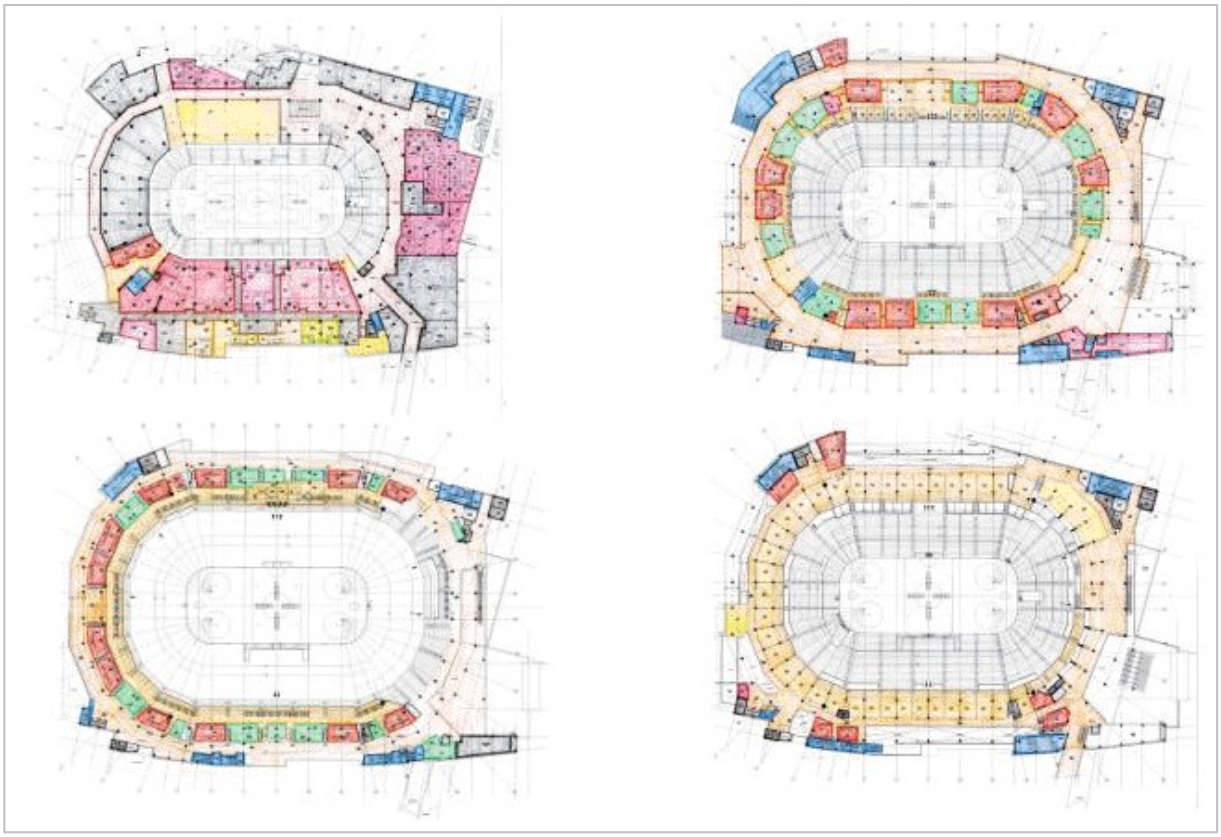
as for individual spaces to be controlled. Before this meeting, we have already discussed with the Client/Architect and know their wishes for the controls.

Service Level
Unconditioned spaces – toggle switch
Common Corridors – on time clock (building to be divided into quadrants for control)
Visiting team areas – dual motion sensor controls
Teams Areas – dual motion sensor controls
General office area – dual motion sensor controls
Stairs – dual motion sensor controls to work in a vertical manner

Main Level
Stairs/Domitories – dual motion sensor controls to work in a vertical manner
Common Corridors – on time clock (building to be divided into quadrants for control)
Toilets – dual motion sensor controls
Food courts – toggle switch with key lock
Elevators
Office areas – toggle switch

Suite Level
Stairs/Domitories – dual motion sensor controls to work in a vertical manner
Common Corridors – on time clock (building to be divided into quadrants for control)
Toilets – dual motion sensor controls
Elevators
Suites to have local dimming switches with over ride from main controls for black outs.

Upper Level
Stairs/Domitories – dual motion sensor controls to work in a vertical manner
Common Corridors – on time clock (building to be divided into quadrants for control)
Toilets – dual motion sensor controls
Food courts – toggle switch with key lock
Elevators
Lower suite level



Example of large venue lighting controls

DESIGN DEVELOPMENT PHASE

LPD now has all of the information in order to proceed into the Design Development Phase. Our checklist:

- ✓ Architectural design team's concept.
- ✓ Local Codes.
- ✓ Sustainability objectives.
- ✓ Lighting level requirements.
- ✓ Lighting control concept.
- ✓ Client's requirements.
- ✓ Facility Managers' feedback and buy-in.

Armed with this information, LPD will start to develop the lighting layout and select the fixtures. We will work out any details for the Architect to combine into the architectural package.

Now the fun begins. The 'hunting' for the perfect decorative lighting fixtures. The enjoyable part is finding all of the different products out there, looking through them, trying to find perfection. After locating the perfect decorative fixtures we will present a sketch of a room with any decorative lighting fixtures for the Client. Or we will sketch up a room that is important to the Client so that they get a clear vision of our design.

Obtaining lighting fixture samples are the best way to insure a quality selection and communicate the concepts to the Design Team. Let the Team know that it sometimes takes 2 weeks to get samples and plan this into the lighting design work schedule.

By the end of the DD Phase the LD needs to have the design almost completed, since the Electrical Engineer has the Construction Document Phase to circuit the lighting design. There might be some minor changes, but by this point the Architect and Client should have approved the design so that the engineering can proceed smoothly. If we have decorative lighting fixtures that are not finalized, we will specify TBD with a wattage allowance and voltage.

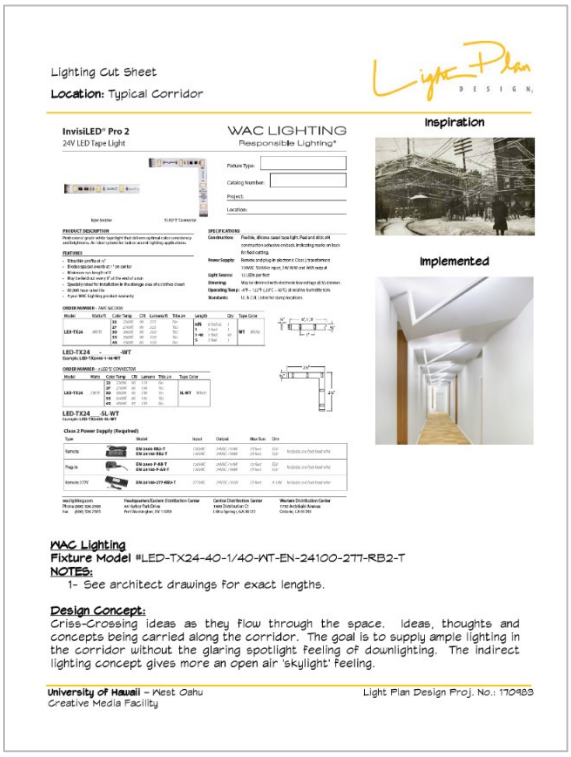
During the DD phase we are creating the lighting fixture schedule. Each project has different requirements for how the lighting package is to be presented. Before starting, double check the style of the schedule, since creating the schedule is very time consuming and there are sometimes different styles for each project.

The same time we are creating the AutoCAD fixture layout and we are preparing the lighting calculations. For lighting calculations LPD tends to create a layout of the entire floor on a single calculation drawing. We keep adding our lighting for each room as we develop the design. Certain projects have requirements for the calculations. Sometimes the calculations are required to be a part of the electrical set of drawings for code reviews or other jurisdictional reasons. In other cases, particularly Government projects, the calculations for each room has to be submitted separately (8-1/2"x11" format), with both the lighting levels and the emergency levels indicated.

This is an example of a complete floor lighting levels and a parking area.

LPD PREPARING FOR THE CLIENT PRESENTATION

While still in the DD Phase, we must remain mindful of the need for a professional looking PowerPoint presentation for the Client. Depending on the Client, the style of our presentation will vary. LPD typically prepares a power point presentation utilizing the plans, elevations, sections and any renderings from the Architect, enhanced to show the impact of the lighting design.


Lighting Cut Sheet

Location: Typical Corridor

InvisiLED® Pro 2
24V LED Tape Light

WAC LIGHTING
Responsible Lighting®

Inspiration

Implemented

WAC Lighting
Fixture Model #LED-TX24-40-1/40-WT-EN-24100-2TT-RB2-T
NOTES:
1- See architect drawings for exact lengths.

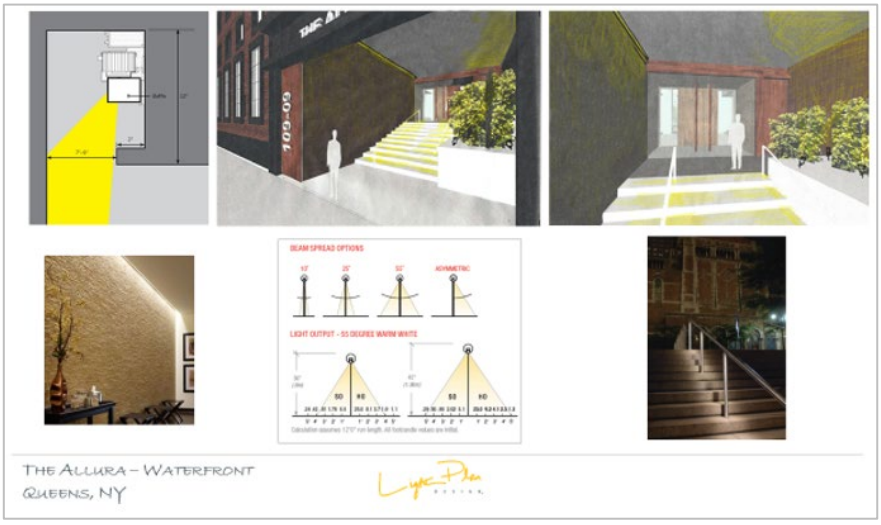
Design Concept:
Criss-Crossing ideas as they flow through the space. Ideas, thoughts and concepts being carried along the corridor. The goal is to supply ample lighting in the corridor without the glaring spotlight feeling of downlighting. The indirect lighting concept gives more an open air 'skylight' feeling.

University of Hawaii – West Oahu
Creative Media Facility

Light Plan Design Proj. No.: 170483

This is an example of a Design Build project, giving the Architect, Owner and Contractor an insight into our design decision.

This is a presentation directly to the Client indicating the location and appearance of the lighting design.



This is a presentation directly to the Client.

CONSTRUCTION DOCUMENTS PHASE

After all of the presentations and receipt of approval, we finalize all of our lighting layouts. We add dimensioning, finish off all of the details working closely with the Architect and complete the lighting calculations. We are usually on a tight deadline at this point since we need to get our documents to the Electrical Engineer.

Once the CD Phase is completed for the lighting design, we work closely with the Electrical Engineer (EE) to pull it all together. We review the lighting fixtures types and wattages with the EE, along with the controls, sometimes providing additional sketches or write-up detailing our controls design. We set the locations of wall controls and motion sensors to work with the spaces. We assist in locating panel closets with input from the Architect. For the emergency lighting, LPD specifies as many lighting fixtures with an integral EM option as possible. We try to limit the number of additional of emergency lighting fixtures. When a dedicated emergency lighting fixture needs to be utilized, we make recommendations, to minimize its intrusion on the overall design.

After LPD and the EE have designed the emergency lighting layouts, we are usually tasked with providing the emergency lighting calculations. For clarity, LPD will go through the drawings and delete all lighting fixtures not used for emergency. By deleting the fixtures we can give the inspector or plan reviewer a clearer understanding of the emergency lighting locations.

CONSTRUCTION ADMINISTRATION PHASE

In some cases, the Owner and Architect ask us to participate in the review of the contractor bids and/or engage us in the bid leveling process before the contracts are signed. This is to ensure that the proposals presented by the contractors and suppliers are consistent with the design intent and are equal to or better than the specified systems and fixtures.

Next comes the lighting submittals review. A careful review is required at this point, since this is the moment we are purchasing the lighting fixtures. It is the last chance to make any changes without significant cost impacts. We need to verify all finishes with the Architect and make sure the aesthetics meet everyone's approval. The EE is responsible for voltage and electrical load reviews.

During the CA Phase, all RFIs are answered in a very detailed manner. There are times when lighting fixtures needed to be relocated for installation conflicts, which will sometimes need to be reviewed with the Architect. We often make site visits before the completion of the project, with the Architect, to physically answer any installation questions.

A site visit when the project is almost completed is an exciting part of the CA Phase. It is exciting to see your design finally come to life. We try to coordinate our visit with the Architects visit so that we can collaborate on any final adjustments to the systems.

LPD we arrive to the site with a small sized set of the RCP's and lighting fixture specifications. Any installation issues will be noted on the drawings and we augment the reports with photos. The punch list report is then issued to the Design and Construction Teams.

It is best for the LD to initially visit the site during the daytime to verify proper installation and that all fixtures are in the specified locations. There are times that the Electrical Contractor might relocate a fixture during construction, for installation coordination reasons, and not notify the Design Team. These deviations are either noted or approved or suitable adjustments need to be made.

LPD will combine our first visit with an early evening visit to verify the aiming, overall aesthetics, light levels and the proper functioning of the controls. This is also critical for the daylighting controls and any fenestration interface. During the evening visit, LPD will take light meter readings to ensure all rooms are at the appropriate level and that the fixtures are working within the manufacturer's specification.

If aiming of the lighting is required, the Contractor will have ladders and electricians available to assist. Sometimes a second visit is required to verify the correction of any errors identified during the initial visit.

POST CONSTRUCTION

When the project is completed, LPD supplies the Owner, Architect and Facility Manager with a list of all installed lighting products, including cut sheets, installation manuals, operation and maintenance manuals and a list of lamping requirements for those fixtures requiring periodic lamping replacements, which are increasingly rare with the advent of LED lighting systems long lifetimes. We will also supply a listing of all manufacturer's representative contact information. When the controls manufacturer programs the control system, LPD can also be present to trouble-shoot any issues.

Sometimes an Owner will request a warranty observation, typically 10-11 months post construction, so that any issues with the fixtures, installation or controls can be rectified within the timeframe of the Contractor's warranty.

Then, we can simply enjoy the fruits of our labor. Voila! Our project has been successfully brought to fruition!

North Bellmore Public Library - Bellmore, NY