Squint / Unsquint:
Associative Composition as a Key to Facade Analysis and Design

by

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Submitted in partial fulfilment of the requirements
for the degree of Master of Architecture

at

Dalhousie University
Halifax, Nova Scotia
July 2011

DALHOUSIE UNIVERSITY

SCHOOL OF ARCHITECTURE

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Dated: July 6, 2011

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DALHOUSIE UNIVERSITY

Date: July 6, 2011

AUTHOR: Colin Carrigan

TITLE: Squint / Unsquint: Associative Composition as a Key to Facade Analysis and Design

DEPARTMENT OR SCHOOL: School of Architecture

DEGREE: MArch   CONVOCATION: October   YEAR: 2011

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Signature of Author

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ABSTRACT

This study explores compositional abstraction in architecture. The act of squinting adopts propositions from Christopher Alexander and structuralist Marcel Mauss. An analytical method based upon element density and regularity is tested through residential facade studies. Observed limitations prompt the introduction of a third axis of exceptionality. Generative possibilities are investigated through a series of facade games.

Focus turns to the facades of parking garages as a neutral background for the examination of compositional qualities. Notable garages are examined, and local design guidelines are critiqued.

Finally, a garage in Halifax, Nova Scotia is redesigned. Compositional ambiguities inherent in the existing configuration prompt the introduction of an alternative, associatively rich diaphragm system based upon the compositional and structural logic of trees. A review of the associative method notes its value as an explicit decision-making tool, but suggests that key formal moves remain beyond the generative scope of organizational modelling.

ACKNOWLEDGEMENTS

CHAPTER 1: INTRODUCTION

Design is a human activity, born of the fact that we are naturally conceptual organizers. What we make and perceive - as architects or otherwise - is a response to how we interpret the relationships and associations of the things which surround us. This thesis is an attempt to pursue this thinking, along selective criteria, in the goal of activating a critical consciousness of organization and association as an approach to design. The mark of success here is to go beyond a merely analytical process, flipping it productively into a methodology which is generative but yet preserves subjective and poetic movement.

Architecture is a synthetic discipline. To make architecture is to draw upon and amalgamate, with necessary expertise, such varied fields as geometry, geology, carpentry, masonry, structural and mechanical engineering, plumbing, chemistry, climatology, sociology, ecology, economics, ergonomics... The list goes on. The question which arises is whether, upon removing all of these things from architecture, we are left with anything at all. The answer, perhaps, is that there is, and it is the organization of form(s).[1]

Thesis Question

Holding to the goal of improving consciousness and intentionality of composition, this thesis proposes the following inquiry: How can a methodology of associative analysis be incorporated as a generative approach to architectural design?

Critique As A Point of Departure

Underlying this study is a belief that critical reflection is an important component of design. Yet this idea may not be as generic as, at first, it might seem. Artist and critic Merlin James, in discussing the particular case of instruction and creative production within art schools, observes that exploratory criticism there is commonly eschewed. He observes that the mysterious, whimsical spirit of art is often held beyond scrutiny for fear of breaking the artist's orphic trance. "Making art," he counters, "like worthwhile criticism, is usually the product of acute awareness rather than impressionistic swoon, and awareness of, as much as anything else, the process of creativity."[2]

James proposes a redefinition of art criticism, away from what he terms "metacriticism",[3] which reduces art merely to a sign or manifestation of a school, period or philosophy under

whose influence it can be categorized. He suggests that critique should centre instead upon the inherent qualities of the individual piece, reading them from the inside out, in "long, attentive discovery of all the visual rhythms, rhymes, contrasts, tensions and harmonies across the surface."[4]

We, of course, are not discussing purely visual art but architecture, and "the visual properties of pictures are not those of buildings."[5] Robert Venturi, in his book *Complexity and Contradiction in Architecture*, nevertheless defends a similar position similar to James'. "Analysis includes the breaking up of architecture into elements, a technique I frequently use even though it is the opposite of the integration which is the final goal of art [...] such disintegration is a process present in all creation, and it is essential to understanding."[6]

Squint

There is a practice in architecture, as with graphic and visual arts, of evaluating qualities of composition by altering or skewing one's normal perception of the subject. This can mean, for example, looking at a piece upside-down on a wall to change one's frame of reference. Or it can simply involve half-shutting the eyes. In this way, we choose to obscure certain information and strip away elemental particularities in order to discern more general trends and impressions.

The metaphorical extension of the squint can be investigated as a powerful tool of abstrac-

Figure 1. Guest House, Mahone Bay

tion, and pursued by a number of methods.

Consider the picture reproduced in figure 1. This photograph is already an abstraction of the facade of a guest house in rural Nova Scotia. The three-dimensional entity has been reduced to a flat plane and skewed somewhat through perspective and the camera lens distortion. Colour has been altered in the printing process, and detail has been compromised by digital resolution.

Figure 2 continues to push the photo-digital squint, with progressive reductions in colour, sharpness, tone and resolution.
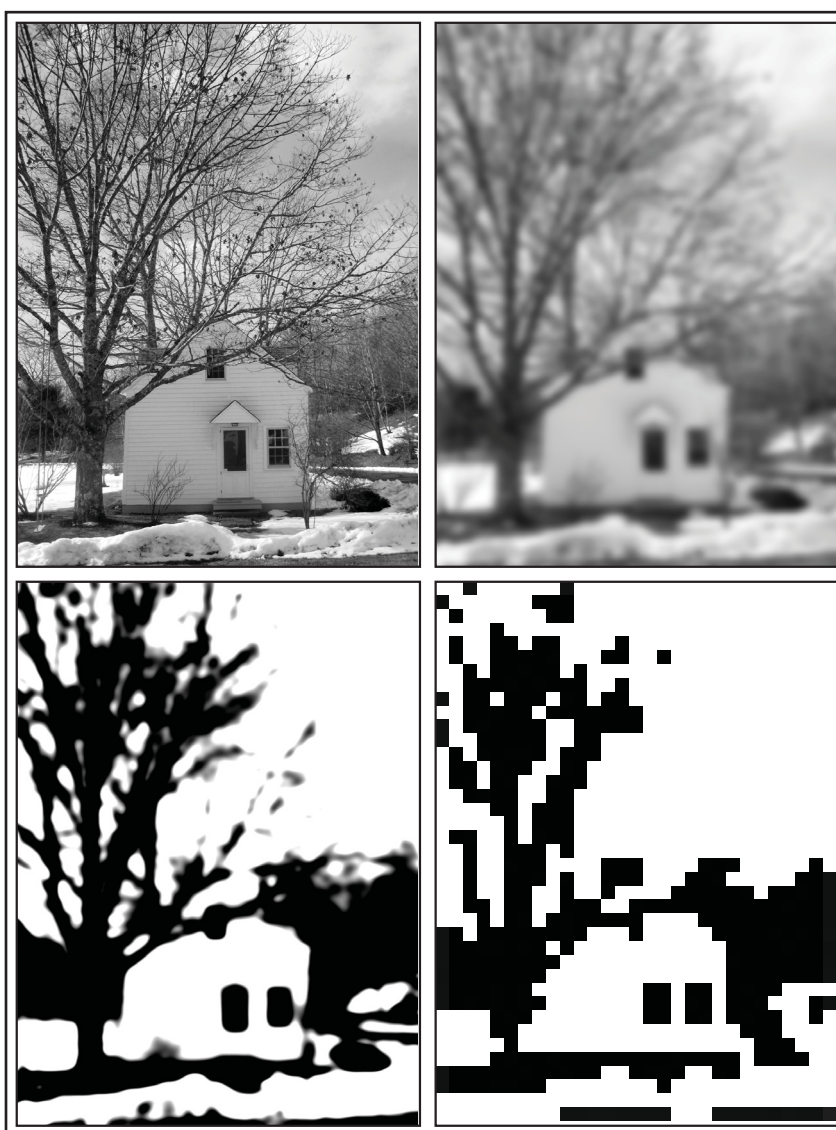

Figure 2. Further (and progressive) squints at the guest house. Desaturation; Blur; Threshold; Resolution.

Figure 3 depicts a child's drawing of a house. This common, rudimentary squint distills the concept of "house" down to the characteristic triangle on top of a rectangle with windows and door.
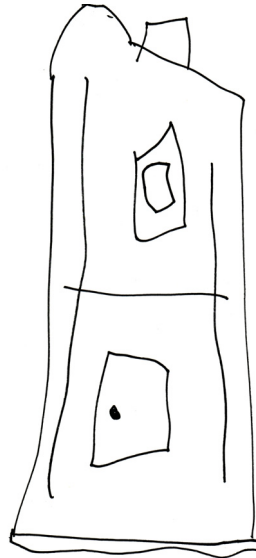

Figure 3. Child's drawing of house.
From the author's daughter, age 4.

In figure 4, the CAD drawing represents the abstraction of the facade into a set of hard lines, all of which depict the edges and boundaries of objects. This is a fictional standardization of the form - a graphic database - annotated with imperial measurements corresponding to an approximated or desired accuracy. Material is not referenced.
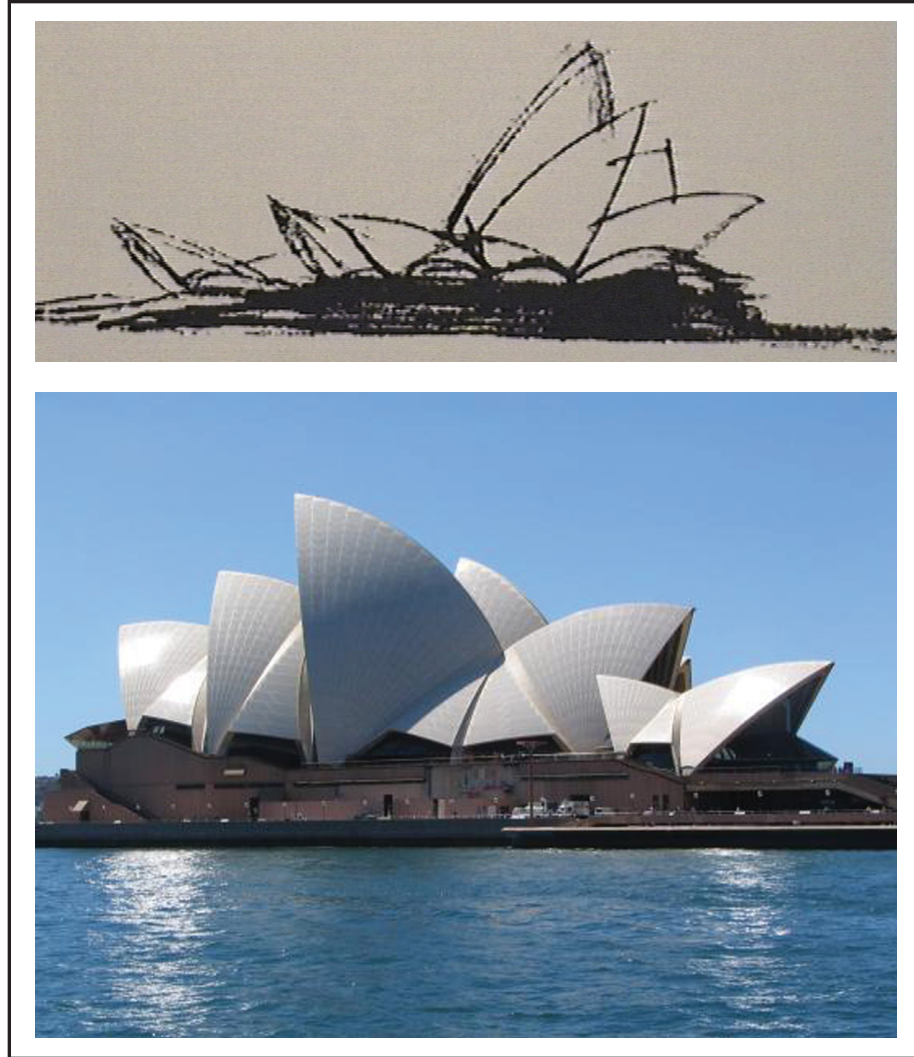

Figure 4. CAD drawing.

Figure 5. Napkin Sketch. From The Traveladdicts. The Sydney Opera House. From Rising Action.

In figures 5 and 6, we see the first glimpses of the "unsquint" (of which more will be said later.) The first is architect Jørn Utzon's "napkin sketch" of his concept for the Sydney Opera House. This initial drawing is an abstraction, but more than simply an organizational diagram, for we see that he is manipulating gross formal ideas which carry through in the eventual design and construction.

In the case of Mathias Goeritz's El Eco project, an art gallery, restaurant and bar in Mexico City, the architect made only one conceptual drawing, serving "as a generative tool for the entire project that conveyed the architectural intention."[7] While this diagrammatic convention squints with even more poetic evocation than Utzon's, it carries formal references which can be clearly identified in the finished building.
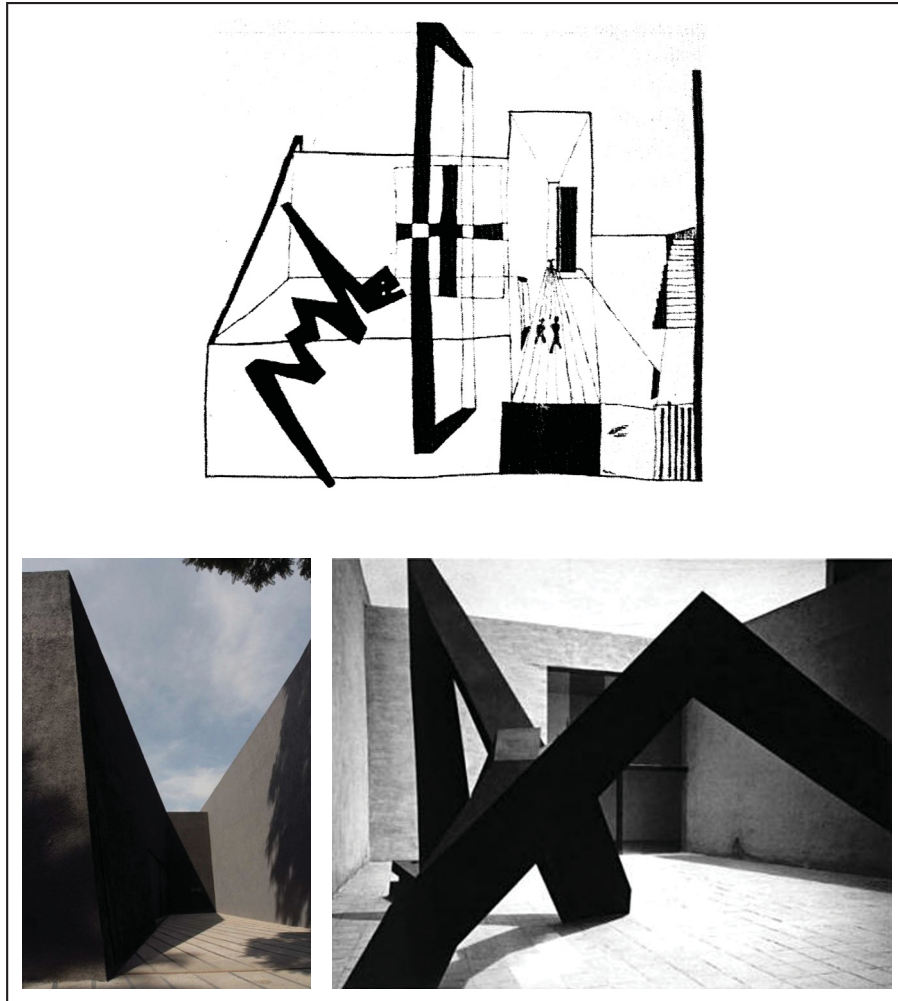
Figure 6. Mathias Goeritz's El Eco, Mexico City. Mathias Goeritz, conceptual drawing. UNAM Archives. From Pelletier, "Modelling the Void". Gallery Photo. From Arch Daily. Gallery Photo. From Flavor Wire.

Organization and Pattern

The physical act of squinting, as with the metaphorical squints discussed above, involves a certain randomness and lack of intentionality in stripping away and abstracting information. My proposal is to establish a squint with a more pointed frame of reference. I aim to grapple with questions of organization and order in architecture: these are to form my critical lens.

The concepts of organization and order must therefore be delved into before proceeding.

Alexander and Mauss on Organizational Thinking

A preliminary framework for understanding the nuances of our organizational aptitudes is

found in the writing of architect and theorist, Christopher Alexander. The problem he has underlined is that, while "grouping and categorization are among the most primitive psychological processes"[8], we still have no language of order; no ways to speak objectively about architectural harmonies and wholeness.[9]

In his essay, "A City is Not a Tree," Alexander proposes a model for analysing organizational structures. Here he distinguishes between the order found in "trees" and those found in "semilattices." The tree, he explains, is the simpler form of organization, as all sub-elements and sub-sub-elements have no association between themselves except through their parent nodes, leading ultimately back to the conceptual "trunk" from which all elements branch hierarchically (figure 7).

On the other hand, his notion of the semilattice describes a network of mutually associated
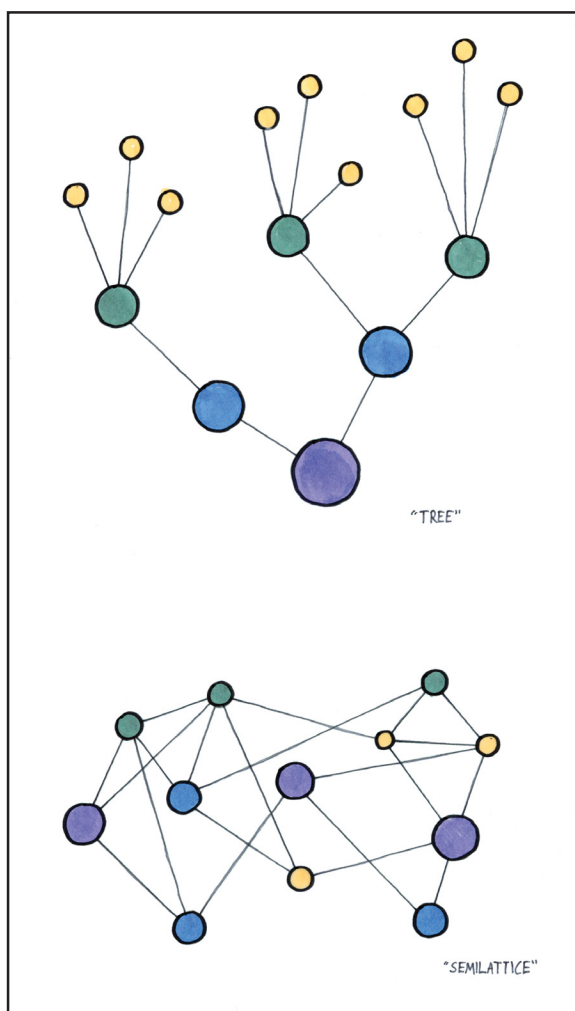

Figure 7. Alexander's organizational paradigms.

significant elements. The choice and identification of these can be based on subjective experience and personal criteria. This style of organization is much more nuanced, and encapsulates his idea of how effective cities are laid out and operate.

"The idea of overlap, ambiguity, multiplicity of aspect and the semilattice are not less orderly than the rigid tree, but more so," he asserts. "They represent a thicker, tougher, more subtle and more complex view of structure."[10]

It remains, though, to give substance to these mutual associations, as neither the tree nor the semilattice are of architectural interest without establishing how these associations are manifested. How do we conceive the presence or absence of relationships between elements? I turn here for clarification to the work of French anthropologist, Marcel Mauss.

Mauss proposes that structure (in its organizational sense) is the collection of relationships of similarity, contrast and contiguity which group individual elements into a whole. He brings forth this idea in his book, *Sociologie et anthropologie*, suggesting that these laws of association are found everywhere, conditioning our understanding of the nature of forms.[11] Leading back once again into the psychology of perception, Mauss writes that the subjective association of ideas leads to the objective association of facts and things.[12]

This model is, in retrospect, a simplified variation of the Gestalt theory of form perception. Gestalt refers to the associations made in the mind when viewing forms in relation to one another, and include relationships of adjacency, direction, similarity, common motion and density, symmetry, closure, good curve and experience.[13] The present study, however, does not debark directly from the platform of Gestalt.

Returning to Alexander's conceptual propositions, now seen through Mauss's categorical lens, the diagramming language takes on a new form. Taking the literal example of a tree (figure 8), we can see the juxtaposition of the models derived from Alexander's and Mauss's views of organization.

In examining the associations in a tree, the trunk gives rise to branches, from which grow leaves. The trunk is associated by contiguity with the branches, and also by similarity of material and, by a change of scales, form. It has no direct or metaphorical association with the leaves. The branches meet contiguously with the leaves, and bear a certain similarity: the pattern variation through bifurcation "rhymes" with and prequels the leaves. The
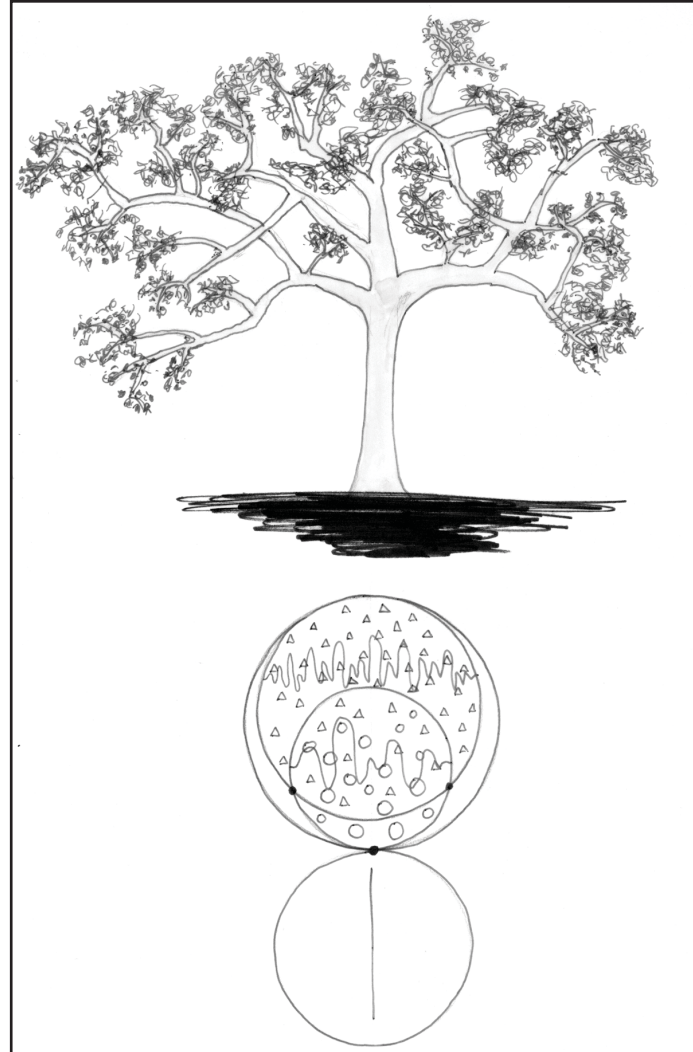
Figure 8. A tree is not a "tree".

materials, however, are now different, and so an association of contrast also exists. The leaves themselves, though physically separate from one another, form a strongly associated set. The resulting, somewhat paradoxical conclusion is that an actual tree is not an organizational tree, as the elements obey both tree and semilattice relationships.

Actuating the Squint

Game-Play

As a prelude to delving directly into architectural compositional analysis, it is worthwhile to illustrate these ideas within the context of game-play: a classic venue for associative reconfiguration.

In the first instance, let us consider the Rubik's cube. The object itself consists of a cube,

each face of which is divided into nine tiles, and each tile being one of six colours. The game begins with the cube tiles in a scrambled state, and the solution is achieved by the progressive reduction of pattern variation into six planar unities, when each face comprises a single colour. Contrast is thus resolved into similarity.

Yet within the descrambling of the cube, there is not limitless recombination. Inherent in the game is the constraint of fixed contiguity between elements, and these are of three orders. The first is found in the twelve mid-edge blocks, where two elements are in fixed contiguity (for example, a blue and an orange tile.) The second is found in the 8 corner
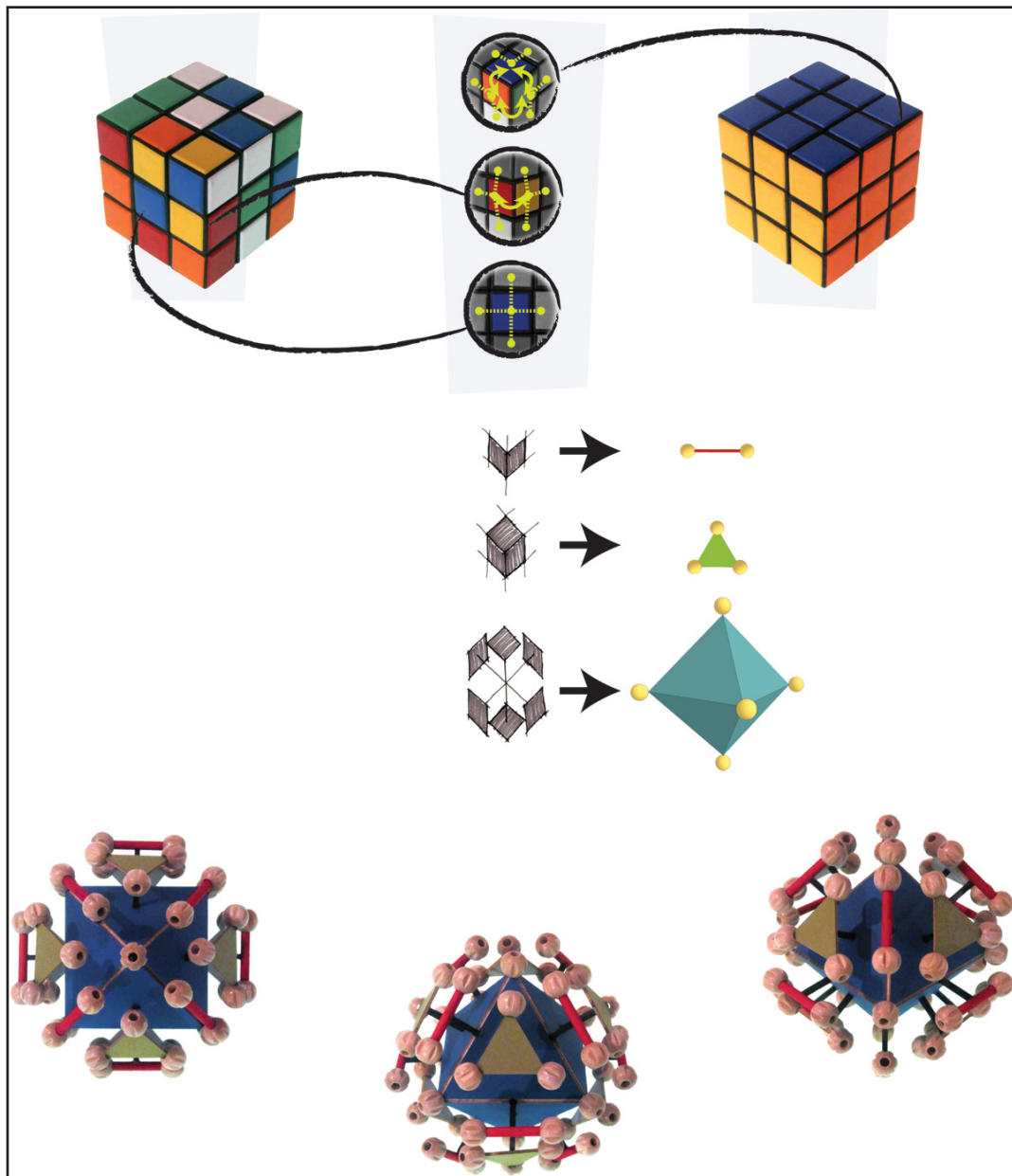
Figure 9. The Rubik's Cube - an organizational study.

blocks, where three elements are fixed (for example, blue, orange and yellow.) The third is the axial node array of 6 blocks at the face centres, one for each of the cube colours. These three orders correspond to associations in one, two and three dimensions respectively.

The associative rules of the Rubik's cube can therefore be diagrammed as seen in the "metacube" in figure 9.

Elsewhere, we can turn our attention to another example of gaming as a laboratory of association. The game of Scrabble is only tangentially a "word" game; or more accurately, it is a game of words in the absence of meaning and lexical context. The game board presented in figure 10 is, at least in part, an example of standard game play. The opening move, "PATTERN", is intersected by "GLAZE" and "GALOOT", based not upon an inherent semantic connection between these words, but simply through shared letters within their alphabetic make-up.

Governed by a different rule book, the game could dispense with vocabulary morphemes and proceed with associative configurations more common to card games, such as the "straight" represented by "QRSTUV"; the "flush" of "VFWHFY" (all 4-point tiles, valuable as "face cards"); or the "HH" as "two-of-a-kind."

The right-hand side of the board switches briefly to a strictly blank-tile configuration, where no external meaning is imparted to the individual elements. The intersecting linear segments so composed make sense only as shapes.

The game is then reconfigured as the arrangement of white and black coloured square, circular and triangular tiles. Though there may not be an immediately clear logic to the arrangement of these tiles, the suggestion is made that, given some theoretical grammar of forms, these assemblies of shapes might make as much sense as the proverbial martian anthropologist would make of the initial alphabetical word game.

The tie-in to architecture suggested here is that we deal with the assembly and organization of forms. These forms are imbued with meaning and context across cultures, epochs, schools of thought and trends, but the rules of association discussed up till now - similarity, contrast, and contiguity - apply. Furthermore, and of particular relevance to this study, is that game-play demonstrates the creative, multiple iterative potential of element recon-

Figure 10. Scrabble.

figuration according to explicit rule sets.

The key organizational difference between the Rubik's Cube and Scrabble is that while the cube establishes restrictions according to which preestablished elements are moved towards completion, Scrabble establishes restrictions and then introduces random elements, the combination of which governs the moves.

A First Proposal for an Analytical Grid

In devising a methodical "squint", capable of capturing qualities of architectural composition which could be considered rich both analytically and generatively, I began with a two-
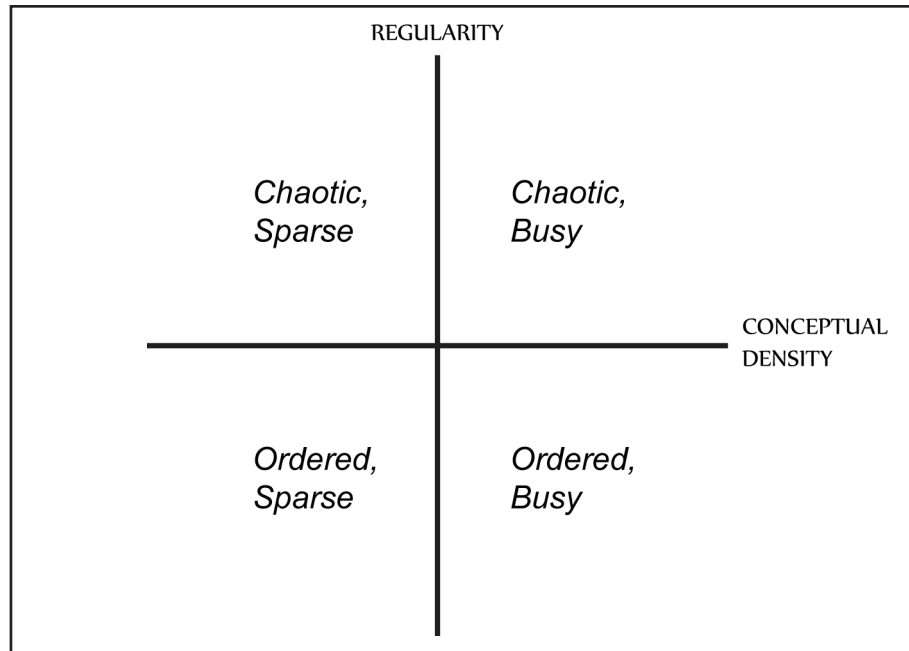
Figure 11. First analytical grid proposal.
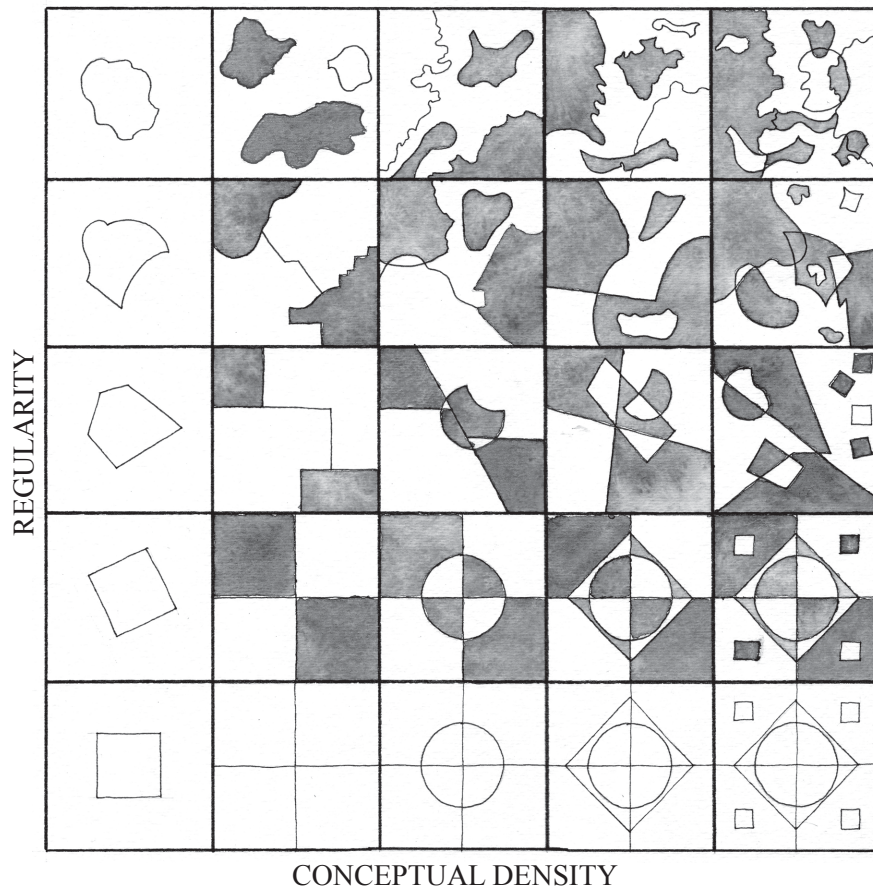
Figure 12. The Conceptual Density / Regularity grid.

axis, conceptual grid inspired by Mauss` structuralist formation (figure 11). The horizontal axis of this grid represents "Conceptual Density", meaning the number of different discernible elements comprised within the composition. The vertical axis represents "Regularity", or the sliding scale between order and chaos which governs the assembly of these elements. An graphic expression of the grid, populated with figurative instances, is shown in figure 12.

Residential Case Studies

While this grid served as a reference for the type of compositional information I wished to gather, a practical and systematic approach had to be devised. I therefore took two residential facades as subjects of analysis. These were the early 20th century vernacular guest house in Mahone Bay, Nova Scotia seen in figure 1, and the "Rudin House" by Herzog and Demeuron in Leymen, France (1996-97.) For each, a single and mutually comparable facade was selected and subjects to a searching series of diagrammatic exercises. The culmination of these studies is presented in figures 13 and 14.

The method involved a semilattice-inspired analysis. Specific element typology was stripped away in order to capture relative elements positions, loose reference to relative element scales, significant alignments and symmetries, and composition of elements within and across sets by associative affinity.

The results were problematic as "squints", as they comported a great deal of organizational information - even for these quite simple study facades - but completely effaced architectural form references. As templates for "unsquint", they could apply to any organizational configuration, from facade to novel plot, but with a very ambiguous rule-set.

Even by pushing the guest house diagram from figure 13 into a three-dimensional model, hoping to more clearly illuminate the organizational characteristics observed, the diagram failed to acquire the depth required to suggest rules for design generation.

In figure 15, the coloured rods indicate individual elements of the house facade, such as "shingled roof","windows" or "step." The horizontal plates represent sets to which each element belongs, and therefore the model addresses semilattice relationships of elements between sets, and tree-style nesting of sets within larger sets. Yet, without reference to
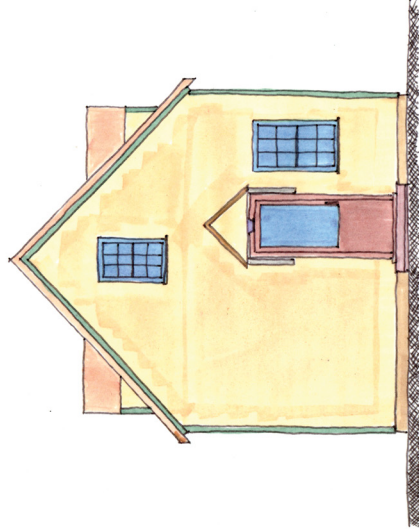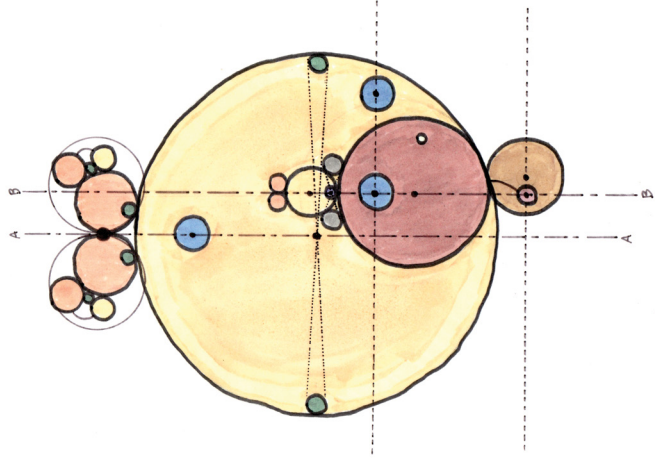
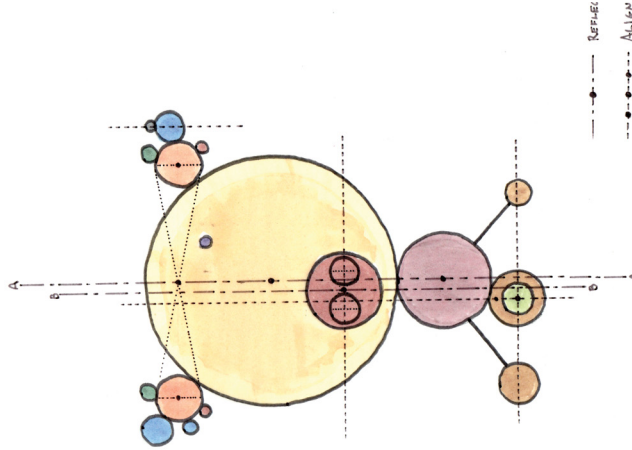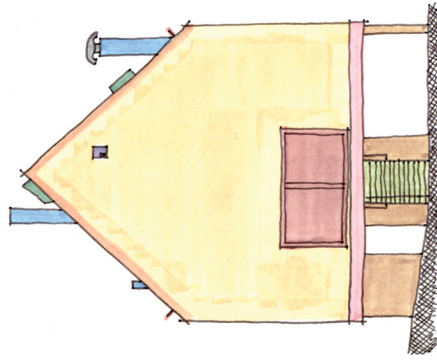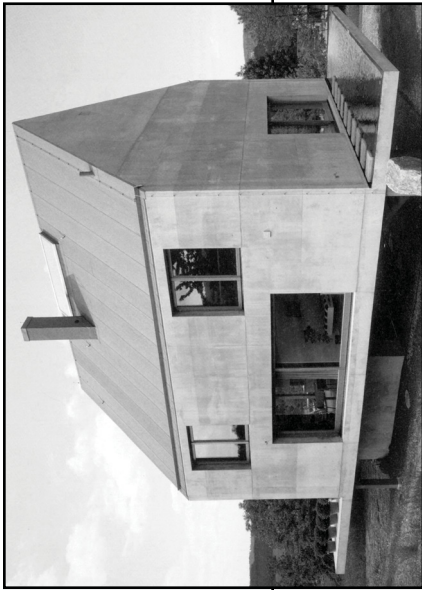IDENTIFICATION OF ELEMENTS

Figure 13. Guest House - diagrammed.

IDENTIFICATION OF ELEMENTS

REFLEX.

ALIGN.

Figure 14. Rudin House - diagrammed. Photo: Gerhard Mack. *Herzog & de Meuron 1992-1996: The Complete Works, Volume 3.*

the specific associations bonding these sets, the game of unsquinting this facade has too few rules to play.

The model does have value, nonetheless, albeit in a serendipitous way. If one discounts altogether the facade it attempts to encode, the model has surprising properties of emergence. Reading the rods as columns and the plates as floor plates, it is a composition which plays with varied floor height distribution, areas of structural sparsity and density, and an intriguing cluster of instances of exceptionality - the triangular plate, the circular "through-pass", and the lone purple column - which lend a spark to the composition. It is interesting to note that this clustering occurs in the region of the entrance in the initially intended facade diagram.
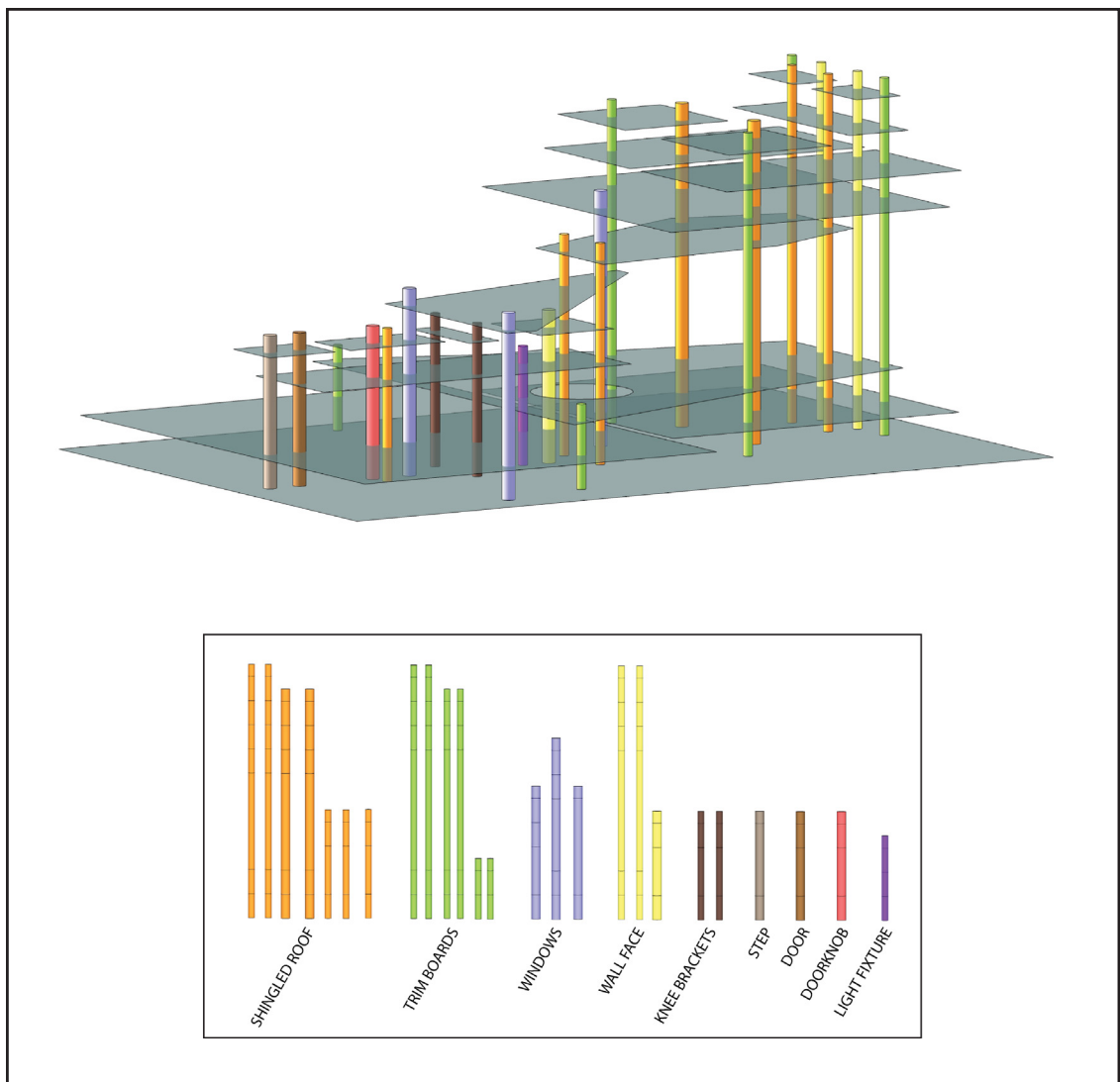
Figure 15. Guest house modelled as a hybrid of semilattice and tree.

The observation that multiple readings could be made of this kind of diagram is a noteworthy lesson. On this subject, Ben van Berkel and Caroline Bos suggest that the strength of diagrams (as opposed to direct referential symbols or icons) lies in their ability to suspend typology, delay specific meaning, and invite various interpretations by providing a "shape" onto which external concepts can be superimposed.[14]

The Analytical Model Revisited

In an attempt to refine and clarify the squint, a guiding set of tenets is proposed as follows:

Design is the assembly of Things;

The number of Things can be few or great;

Things are organized by similarity, contiguity and contrast into sets;

These sets exhibit both the nesting and overlap which are characteristic of trees and semilattices;

Set organization derives a sense of regularity or irregularity based on the number of exceptions to the rules of similarity and contiguity it accommodates;

The character of Density and Exceptionality can vary within a design based on the perceptual scale or frame of reference.

Frame of Reference

In explanation of this last tenet, I'm referring to the differences which can be observed within a composition depending on one's scope of observation. To borrow the language of the visual arts, the landscape / still life / portrait frames of reference can reveal varying levels of complexity. As an example, consider the painting *Bacchus & Ariadne*, by Titian, shown in figure 16.

Here, the picture as landscape features characters, mythical and real, proceeding from right to left out of a wooded area towards Ariadne, who stands on a sea-side cliff under a blue and cloudy sky. As a landscape, the image contains both densely and sparsely animated areas, with a distinct blue/brown dichotomy between the upper left and lower right corners. Zooming to the still life scale, the group of revellers in the lower right corner are depicted in compositional terms which are quite distinct from the picture as a whole. A further zoom into the detail of the satyr's head and shoulders reveals a portrait-scale frame of reference which, again, establishes its own tonal and formal logic.

We can return to the vernacular guest house seen earlier for an architectural illustration of

Figure 16. Bacchus and Ariadne. Titian. Photo: Artmight.com

this. In figure 17, The house sits in a landscape beside a tree and surrounded by woods and patches of snow. Although the landscape of the scene, the still life of the house and the portrait of the window coexist visually, it would be overly reductive to speak of them using a single compositional description.

A Three- Axis Matrix

As a refined iteration of architectural squint, a new 3-axis analytical matrix is imagined, and presented graphically in figure 18.

This new model conserves the "conceptual density" axis, but replaces the former "order" axis with the more nuanced "associative density." This is an attempt to describe order in more specific terms by registering the vigour of the association between concepts within a set. How many rules of association are binding the composition together? Are they few, or are they many?

Figure 17. The Mahone Bay guest house: landscape, still life, and portrait.

The third axis, "exceptionality", introduces the notion that we can allow a certain amount of associative rule-breaking, without it fracturing the set. Variations in alignment or tone or shape, for example, can be tolerated without negating associations being generally present. This exceptionality does, nonetheless, lend a quality of which I feel is important to capture when discussing composition.

In order to more fully operationalize this model, it is necessary to look closely at associative density, and make explicit the rules of association which are being considered. These are enumerated in figure 19, referenced to pictorial "playing card" images, and corralled into the sub-categories of "Similarity", "Physical Contiguity", "Implied Contiguity" (ie, conti-

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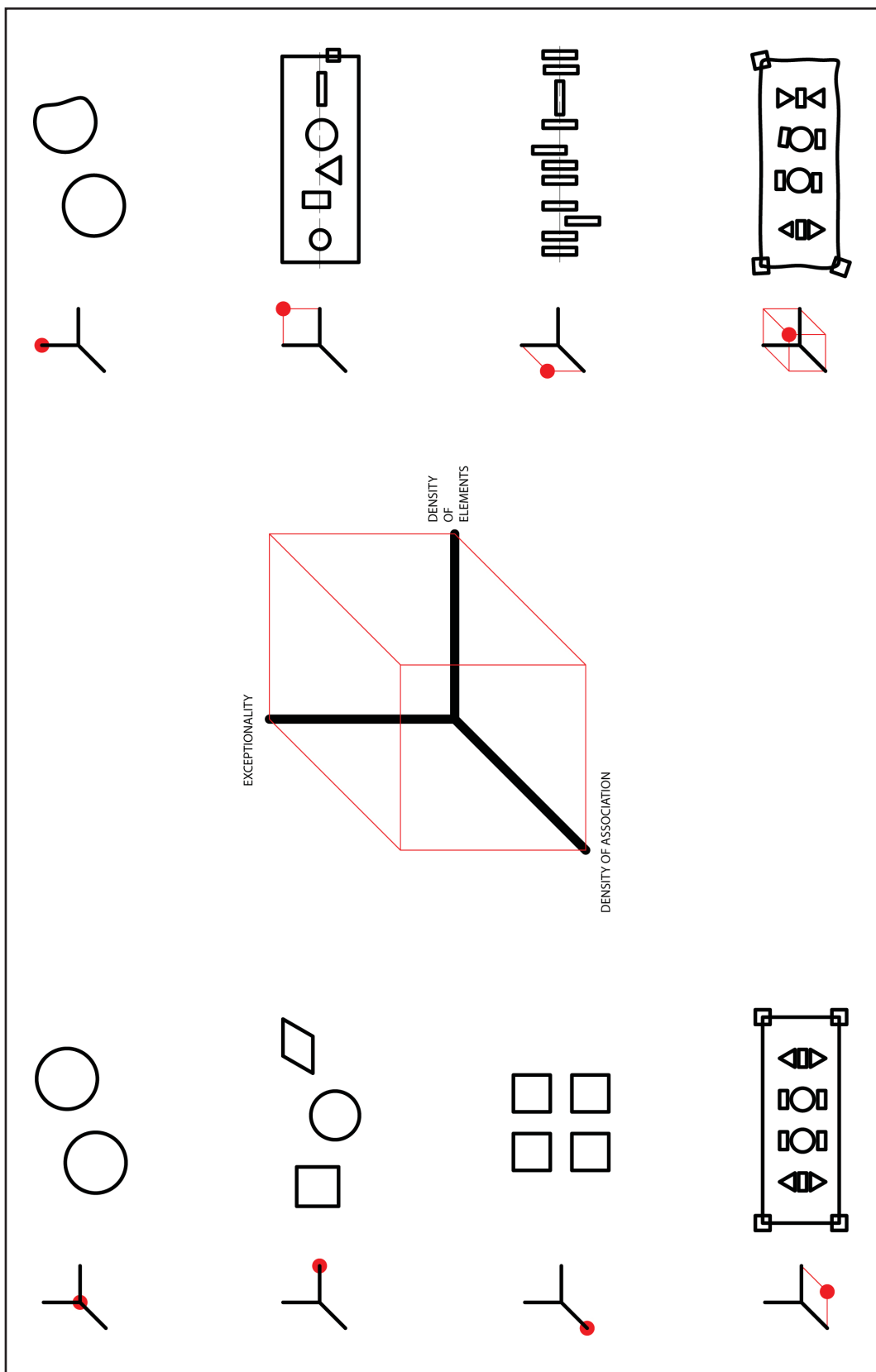
Figure 18. A three-axis analytical matrix.
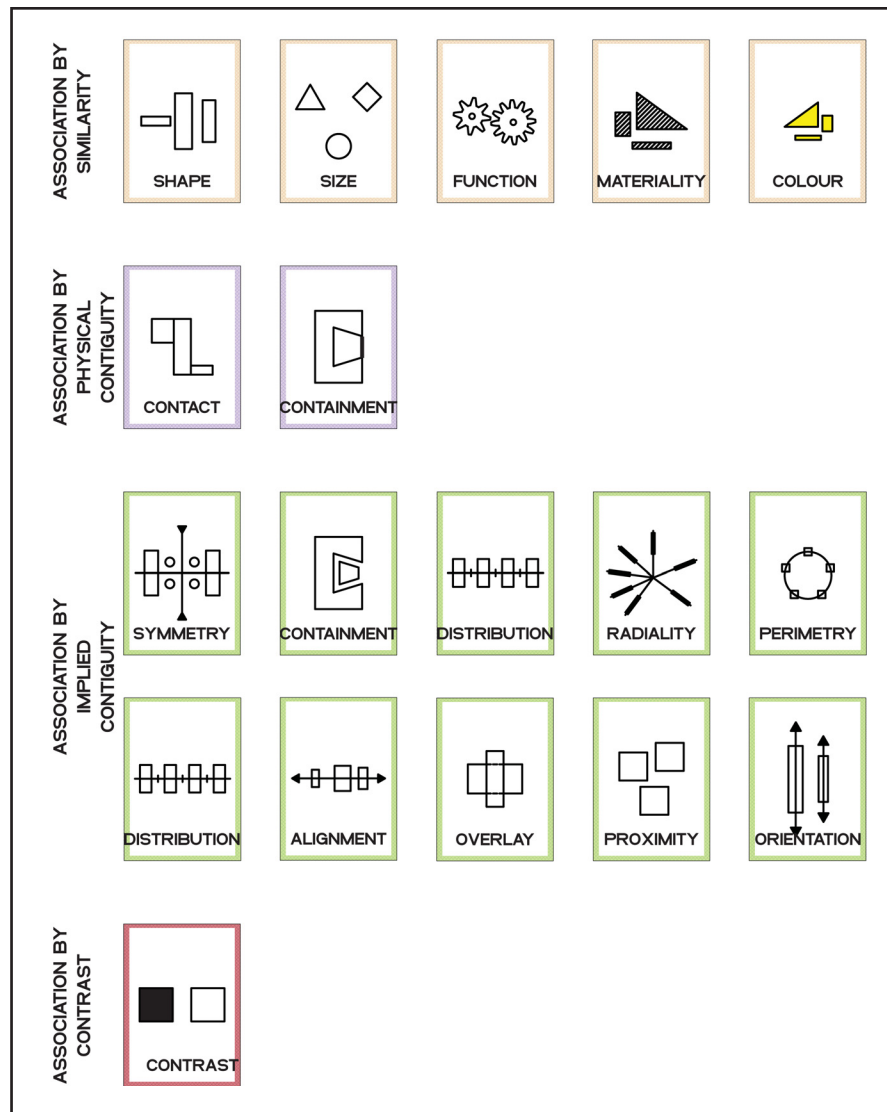
Figure 19. Associative rules as game cards.

guity to geometrical organizers), and "Contrast."

Operationalizing the Matrix

To test the analytical and generative potential of the new matrix, a study was made of the western wall of St. Mary's Basilica in downtown Halifax, Nova Scotia. Here, the wall of stained glass windows can be seen to follow different compositional configurations, depending on one's scale of reference.

As a "still life", the window wall has a strong associative density governing a low element density (figure 20). The windows, a single "set" at this scale, can be described as being similar in shape, materiality, and function. They also share associations of alignment, dis-

tribution, orientation, and symmetry. There is some exceptionality observed in the alignment and distribution of the stonework wall, but the windows themselves form a quite regular composition of a repeated single element.

On the portrait scale, however, (figure 21) the individual windows are characterized by a much greater density of elements (the contrasting coloured tiles composing the iconic image), and the introduction of exceptionality in the associations of alignment, distribution, symmetry and orientation, as the language established by the framing elements is ruptured by the unpredictable formal arrangement of the coloured tiles. Associations of materiality, contact, containment, contrast and function remain intact.

Figure 22 represents an attempt at scrambling these relationships to produce a viable and pleasing, yet markedly different composition. Here, the individual window adopts high associative density by the use of repeated square glass mono-elements. Exceptionality is found in the varied rectangular framework, and element density in increased through the introduction of solid, dark horizontal waving bands which rupture one's tolerance for associative exceptionality to the point of identifying these as another element.

The still-life wall composition maintains highly regular associations of alignment, distribution, orientation, but exceptionality is now introduced in the unpredictability of the precast lintel and sill forms. By a gestalt inference, the dark horizontal wave traversing the window course becomes a new compositional element, existing apart from the repeated (though exceptional) window elements, and yielding the emergent sense of continuity along their length.

ST. MARY'S WINDOWS AS A WALL SET
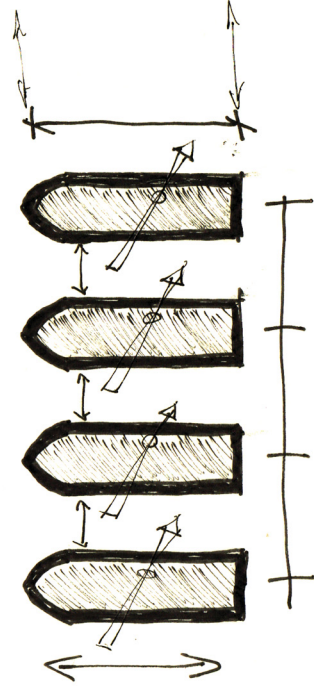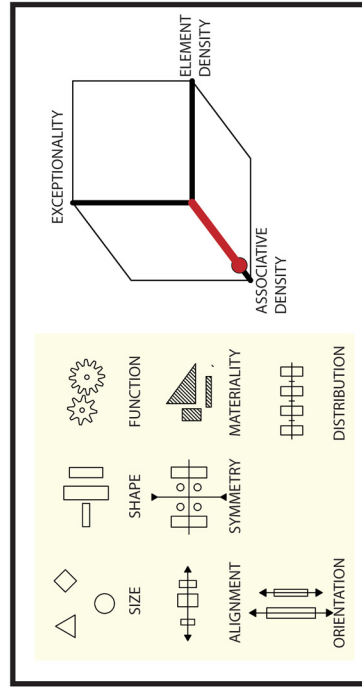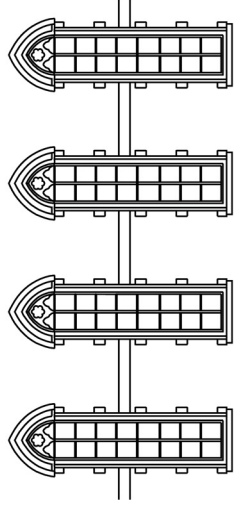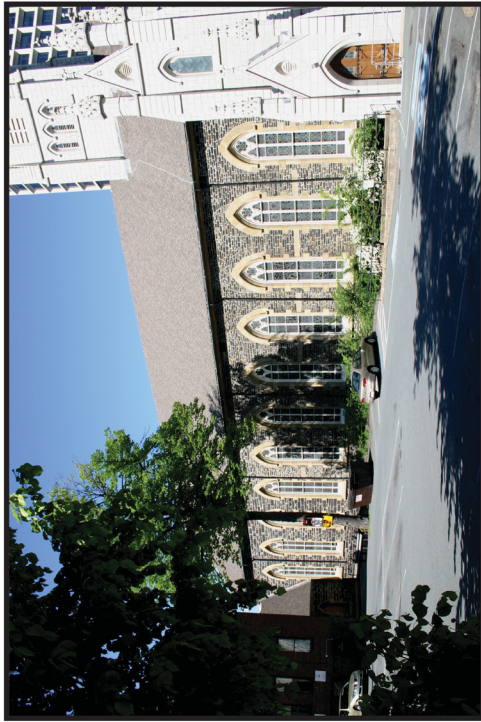
Figure 20. St. Mary's windows as a wall set.

ST. MARY'S WINDOW AS AN ELEMENT
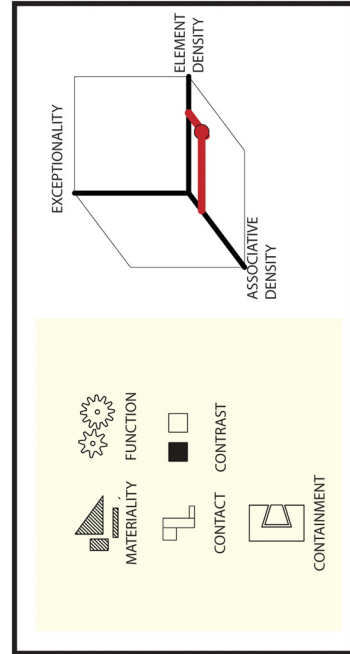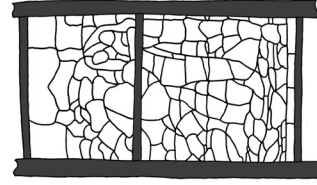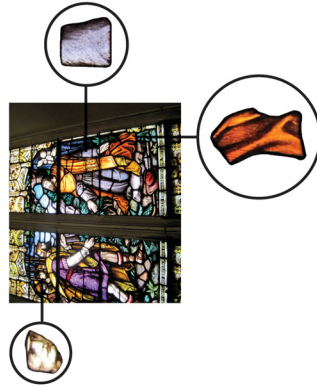
Figure 21. St. Mary's window as an element.
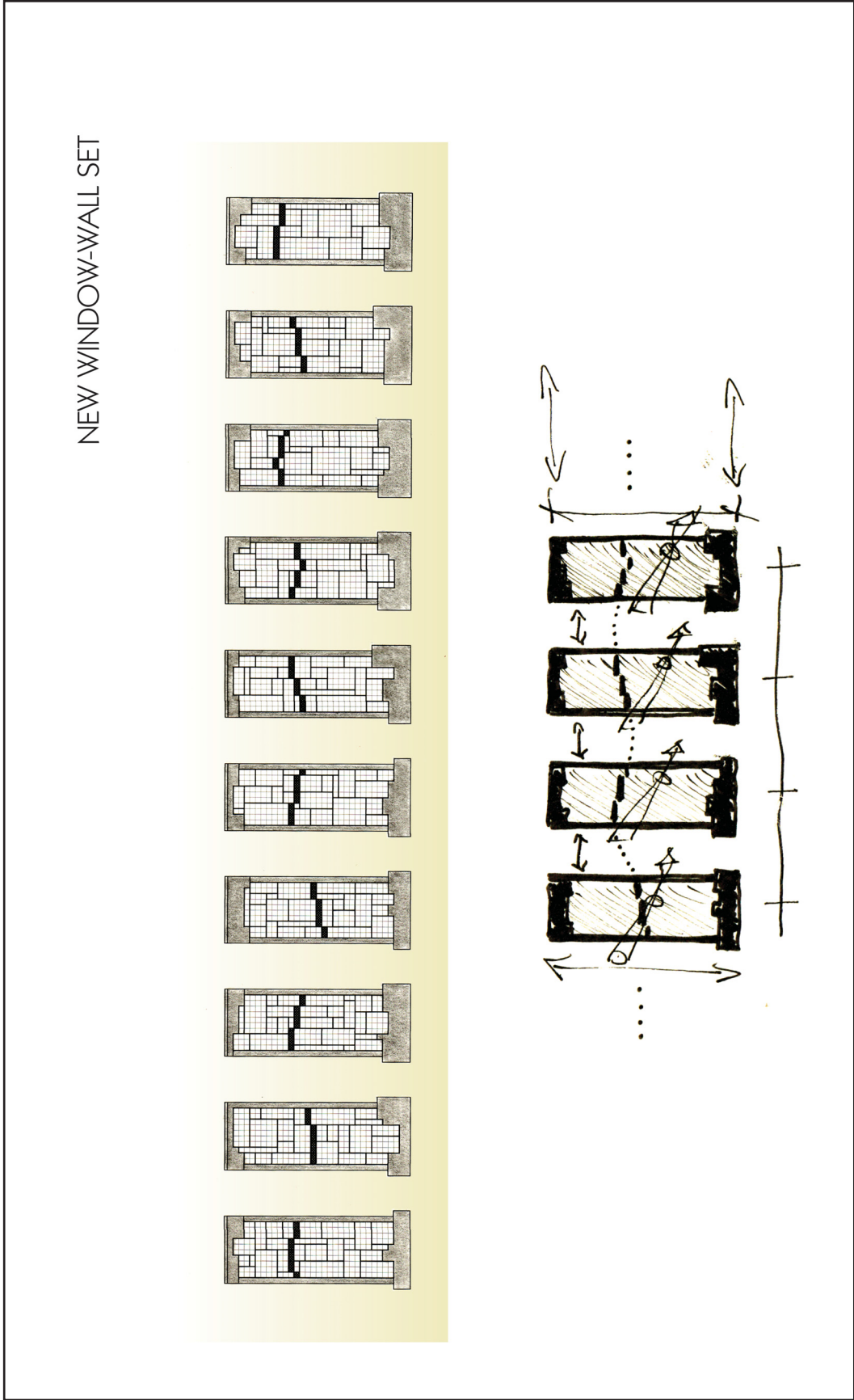
NEW WINDOW-WALL SET

Figure 22. New window-wall set.

## Design Games: Manipulations of Associative Rules

To further pursue the manipulation of organizational relationships, I returned to the idea of game play. Having established a set of associative rules, a series of "games" was proposed to provide explore these as conscious design tools.

The strategy for each of the games was first to produce a seed composition by assembling objects found around my studio. I then mapped these as a facade on a generic oblong structure to produce the starting move, much like an opening hand of cards. A fifteen minute timer was used for this first game phase in order to eliminate excessive editing and revision, and move quickly to a working composition. Having determined the type of manipulation I would be attempting in each case, and employing a deck of cards based upon the icon set shown in figure 19, a series of design modifications were played through. Again, these were subjected to fifteen minute time limits to promote spontaneity in resolution.

The value of this exercise was not in the production of a set of outstanding facade designs. The true interest lay in visualizing and working deliberately with the associative rules, and assessing their compositional implications. Figures 23 through 25 illustrate three different game sequences as they were played out.

"DILUTE"
Draw associative rules, removing them sequentially.
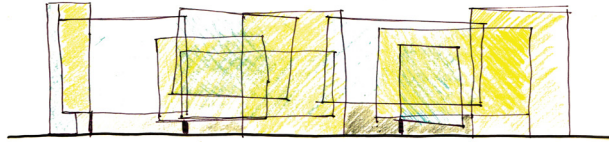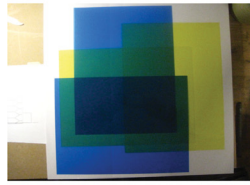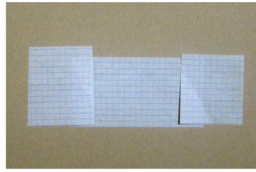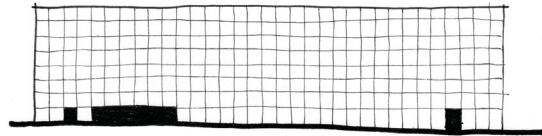
OVERLAY

CONTAINMENT
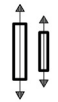
ORIENTATION

SHAPE
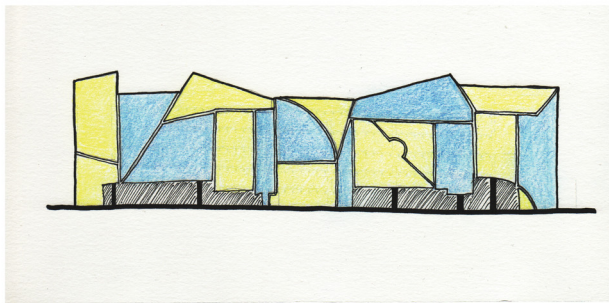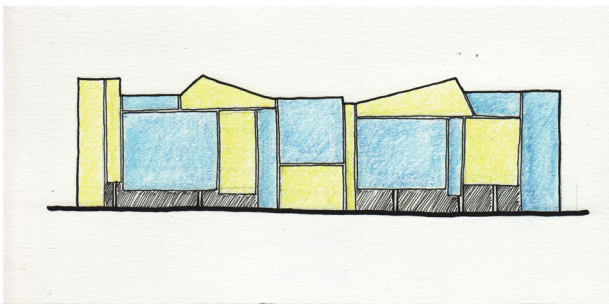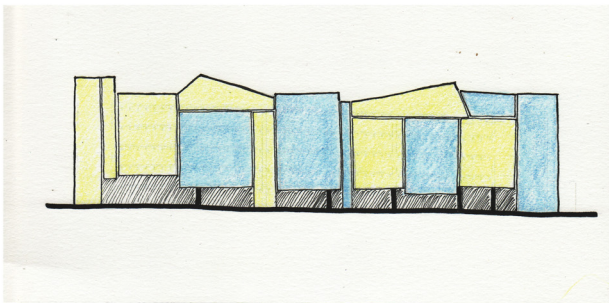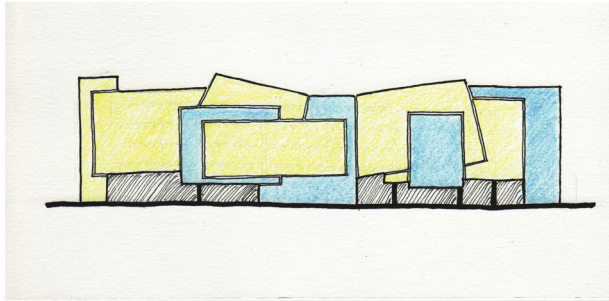
Figure 23. Game 1, "Dilute."

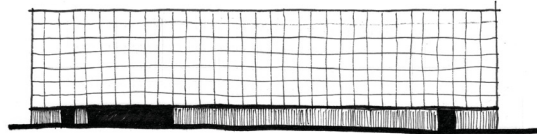## "ELEMENT TWEAK"

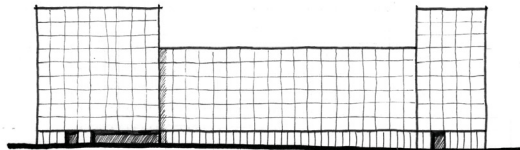For any set, increase or decrease element density.

—

+

+
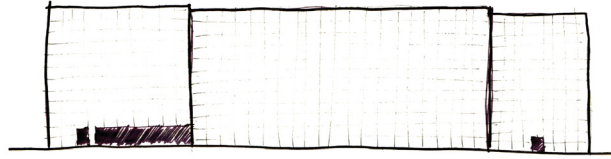
Figure 24. Game 2, "Element Tweak."

"FORTIFY"
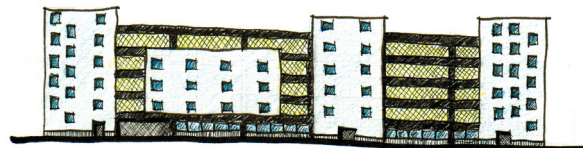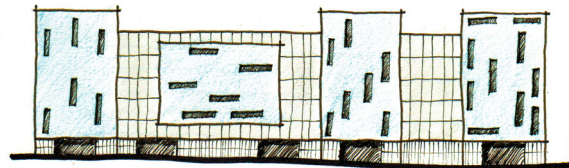## Draw 2 associative rules and fortify them.

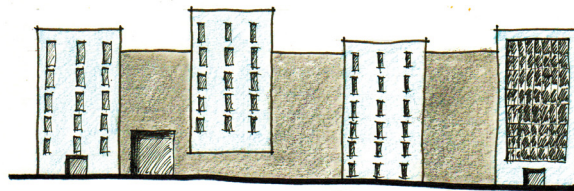ORIENTATION   DISTRIBUTION
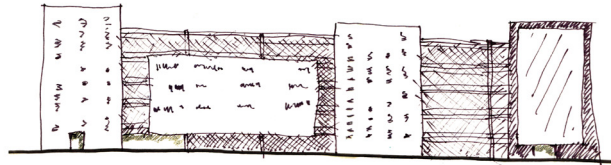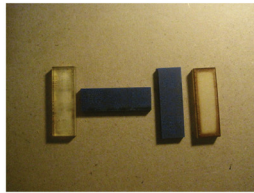

MATERIALITY   SIZE

FUNCTION   CONTAINMENT
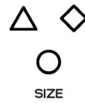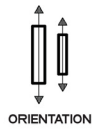
Figure 25. Game 3, "Fortify."

The Parking Garage: A Problem of Facade

My study of associative composition has thus far hinged on facades: at first residential facades in my preliminary case studies, and then generic ones in my game series. For the purpose of advancing these investigations into a final design challenge, the parking garages as a building type arose as a worthy subject of investigation.

Programmatically, the garage is quite a restrained entity. Its purpose is to accommodate large numbers of stationary vehicles, allowing their passage in from and back out to the street, and vertically between decks. They must meet requirements of lighting and ventilation, as well as access from driver/pedestrian users.

In practice, these buildings are almost exclusively situated (with airports being a rare exception) in densely occupied city centres. It is in their nature to be uncharacteristically large within their urban context, and they commonly lack the facade articulation manifested in office, commercial or residential structures. A particular contextual mismatch common with garages is the external expression of the sloping car decks, which are a necessity of circulation, but which introduce angular elements frequently at odds with the surrounding streetscape.

The design of the garage facade is a challenge. There are examples, though, of successful architectural solutions to this problem, and some of these will be looked at presently.

Case Studies

Herzog & de Meuron. 1111 Lincoln Rd, Miami, FA. 2010

The Herzog & de Meuron building is an example of a treatment of a garage which defies compositional expectations. The street level is articulated as a densely associated, glazed commercial level. Yet in contrast, the parking decks above play unexpectedly with alignment and distribution, and the expression of walls is entirely removed, with the exception of the glass box structure (echoing the ground element) on the fifth floor. The treatment of the columns is also a play in exceptionality, where shape and distribution are pushed past the standard column grid protocol.

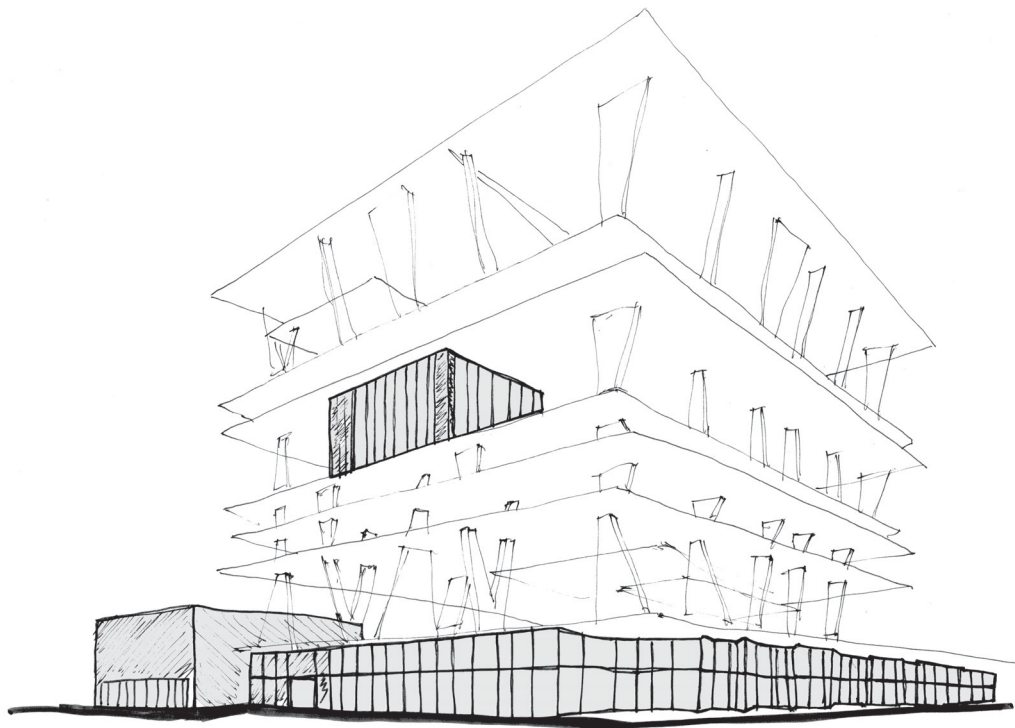Figure 26. Herzog & de Meuron: 1111 Lincoln Park Rd, Miami. Photo Source: Flickr
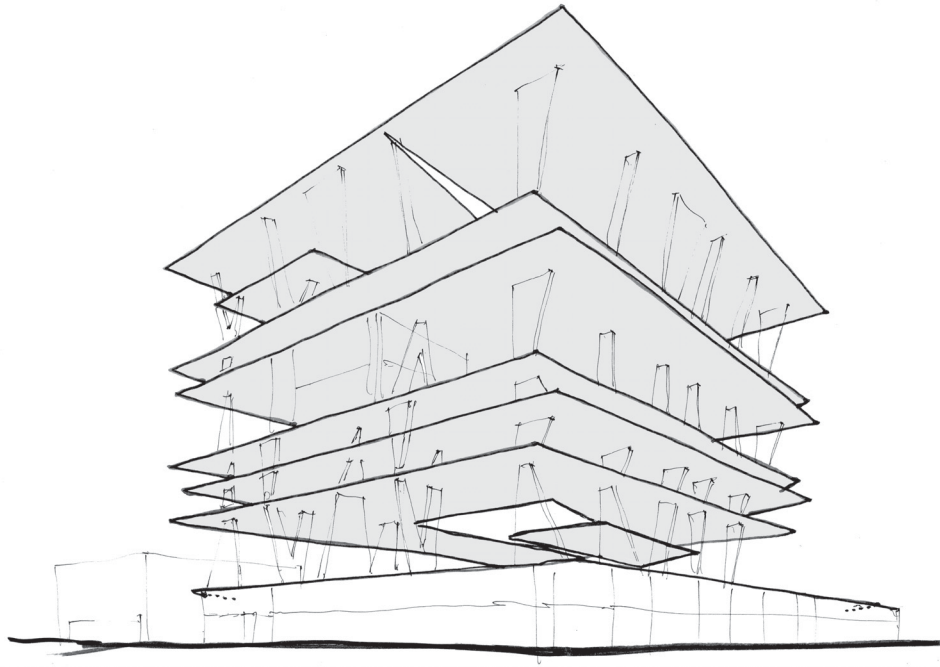

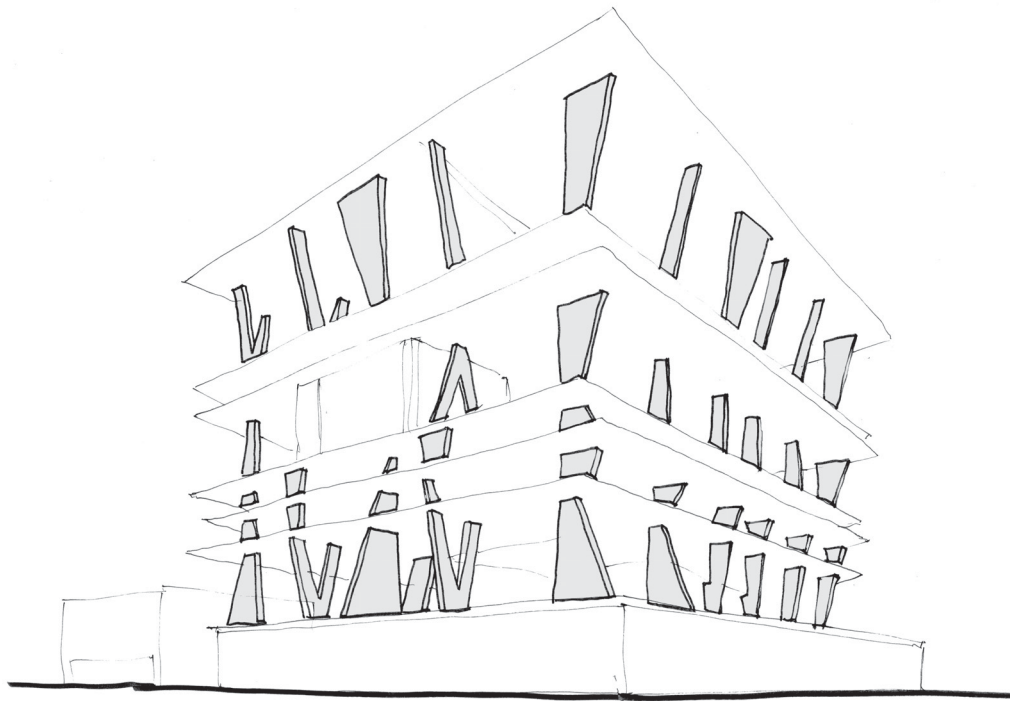Figure 27. Plinth study.

Figure 28. Floor plate study.

Figure 29. Column Study.

Frank Gehry (Brooks + Scarpa Remodel). 3rd Street Promenade, Santa Monica, CA. 2011.

The Gehry/Brooks + Scarpa garage features a much different tectonic approach than the Herzog & de Meuron. Here, an open street level commercial presence is surmounted by a screened stack of level parking decks. The screens feature horizontal slats, arranged in exceptionality to the anticipation of regular alignment, distribution and colour. The stairwells are articulated with prominent open stairways at the ground level, which climb into the twin red-faced, tightly and regularly slatted box towers which stand proud of the main garage structure.

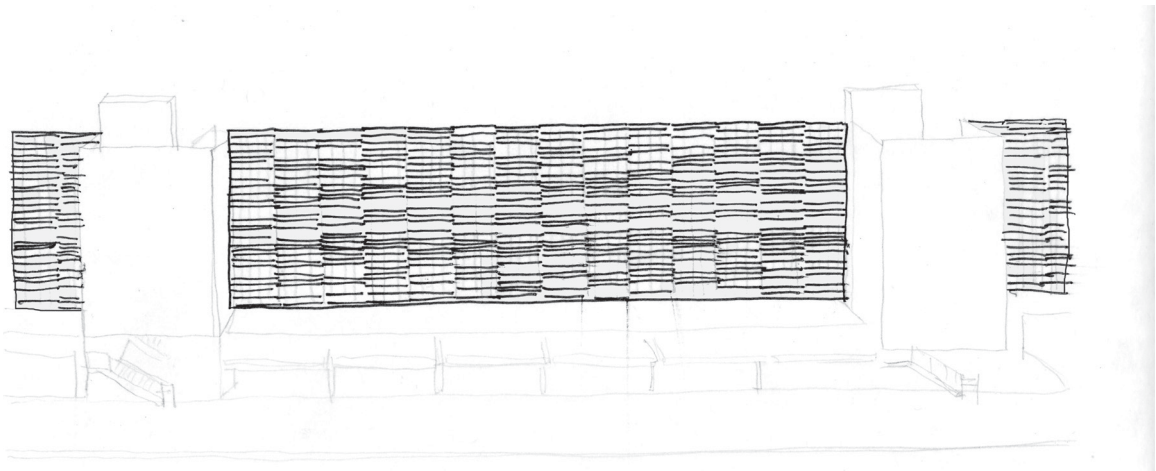Figure 30. 3rd St. Promenade, Santa Monica, CA. Photo Source: Dexigner
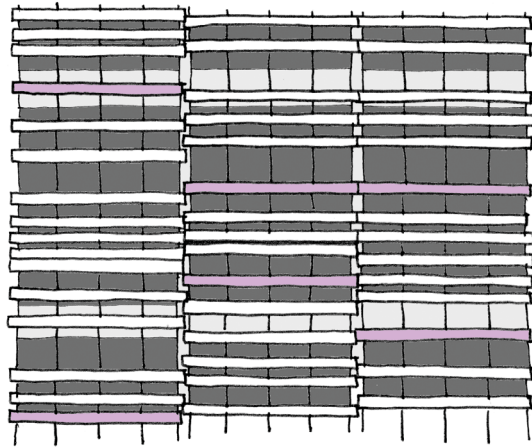

Figure 31. Screen study.
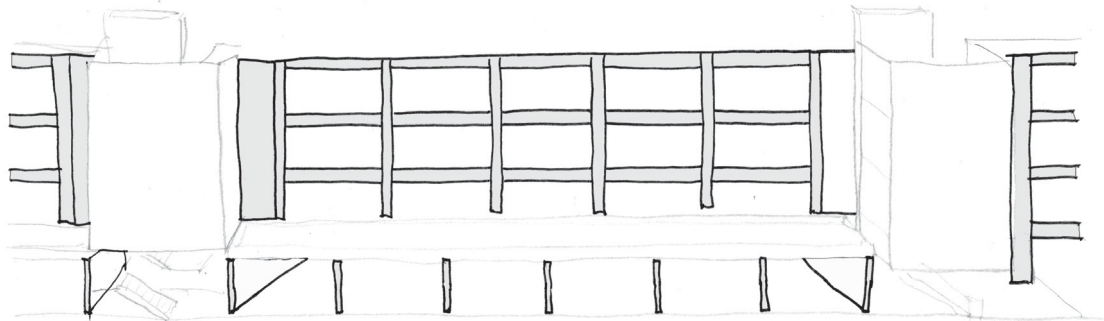
Figure 32. Screen detail.
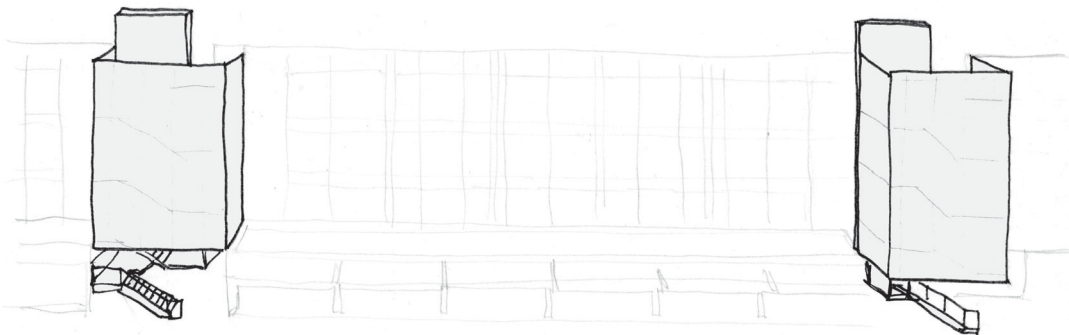

Figure 33. Column / beam study.
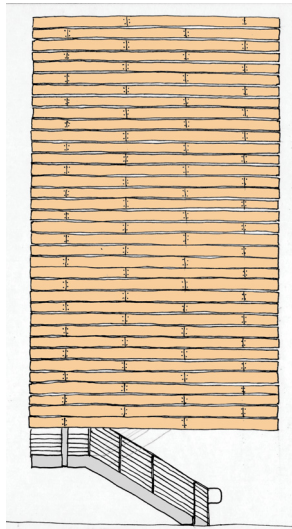

Figure 34. Stairwell study.
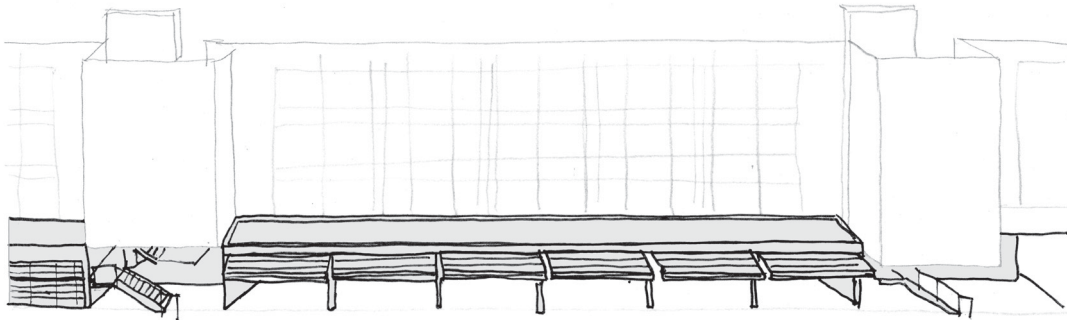
Figure 35. Stairwell detail.

Figure 36. Base study.

Paul Rudolph. Temple St. Garage, New Haven, CT. 1959-63.

The Rudolph garage presents a third, distinct formal treatment of the garage. Here, the use of cast concrete integrates the column system, the decks and the walls. The repeated lipped double column is employed is a composition of minimal element density, governed by high associative density. Exceptionality occurs through the expansion of width and height at the entrance. Recessed behind the street level arcade, and divided by the entrance thoroughfare, is a commercial block whose expression is as a separate, lightly framed rectilinear structure.
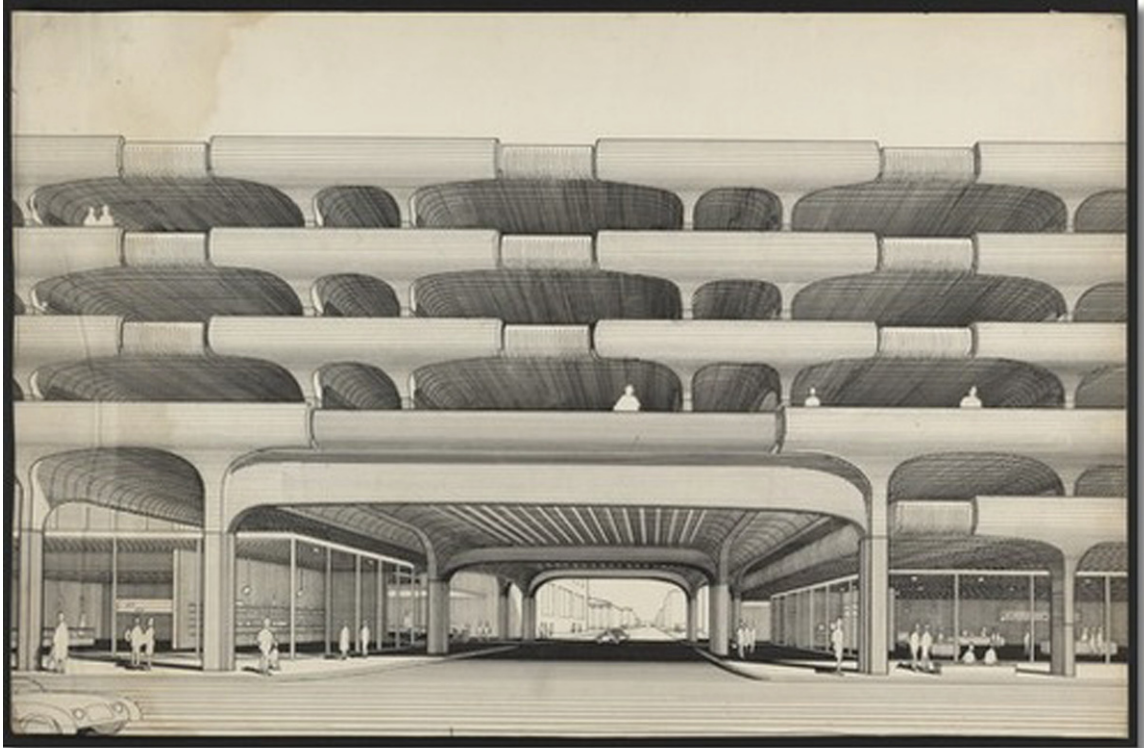
Figure 37. Paul Rudolph, Temple St. Garage, New Haven, CT. Photo Source: Encore Editions
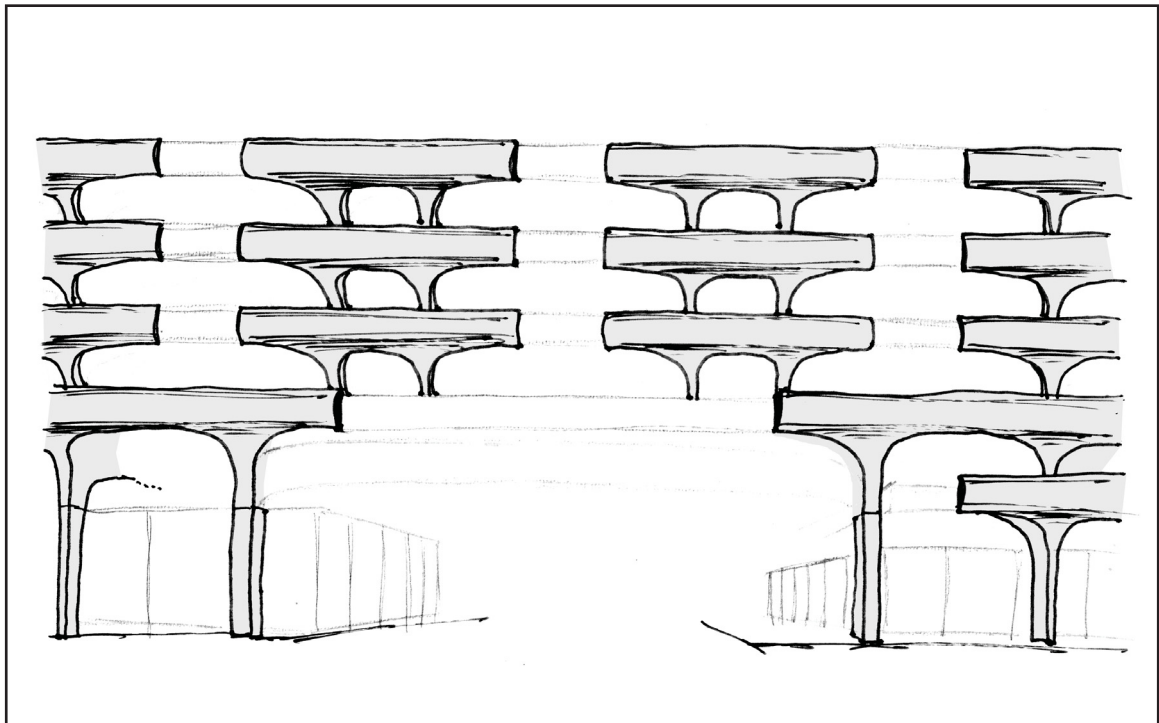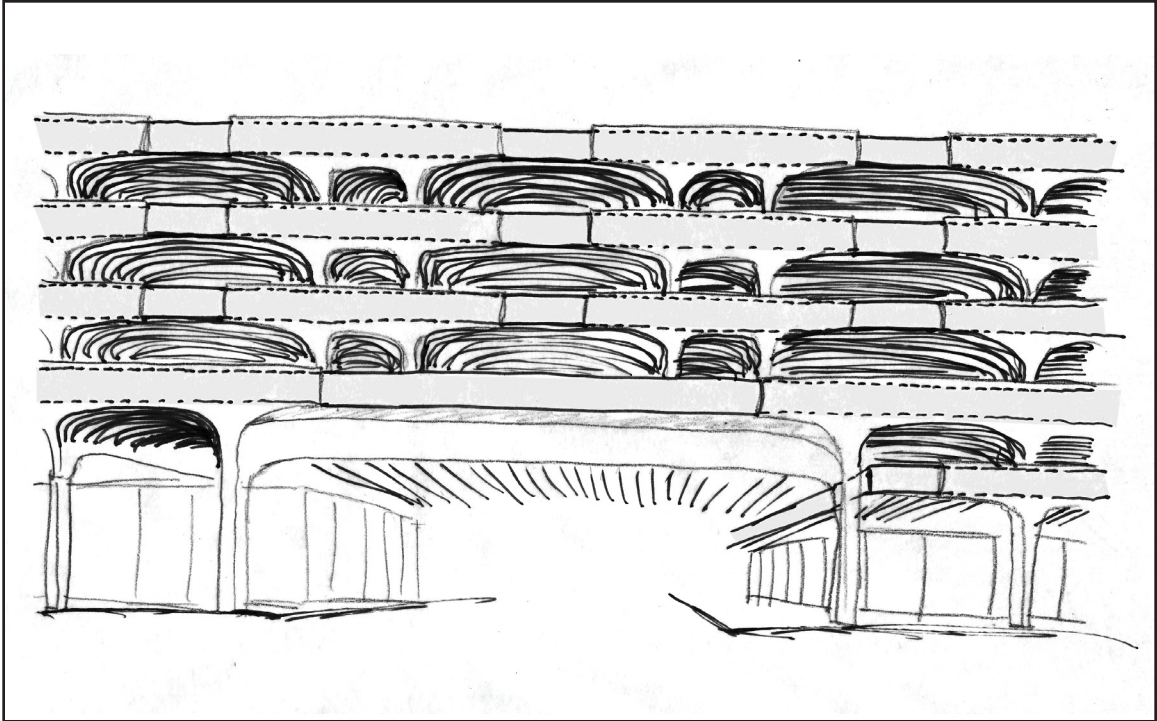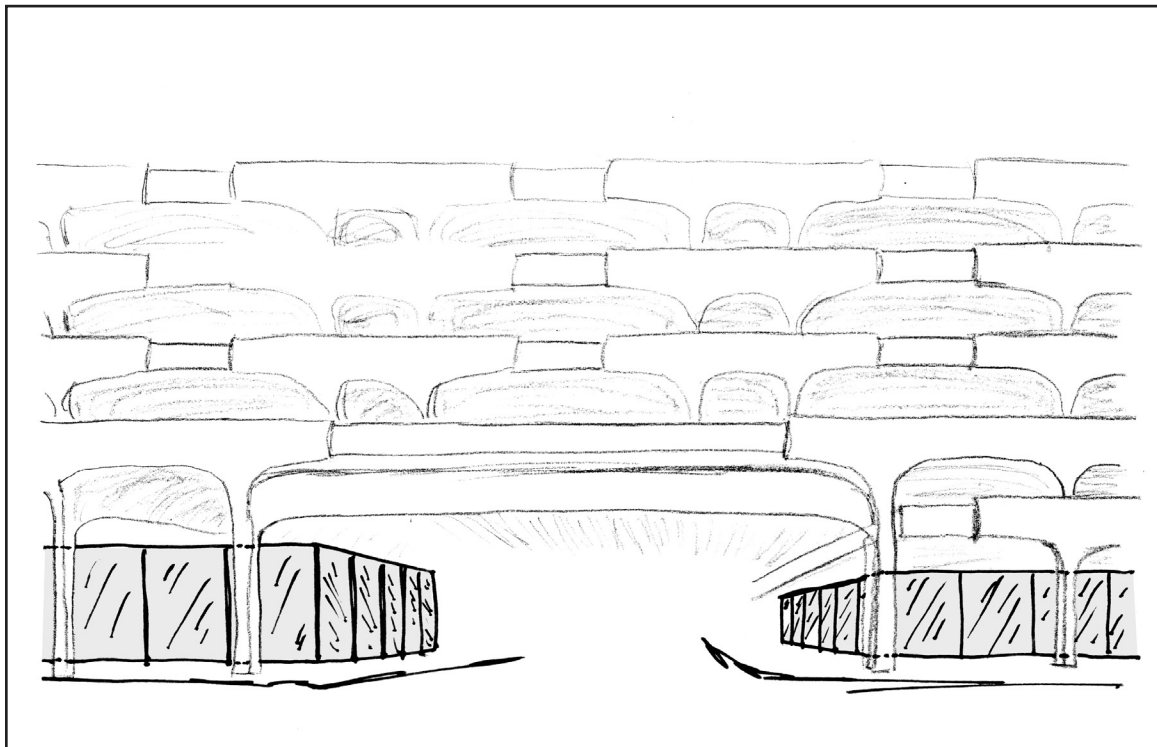

Figure 38. Column detail.

Figure 39. Deck detail

Figure 40. Commercial block.

HRM By Design: An Organizational Prescription Examined

Having looked at some notable garage designs, attention must be turned to the design manual published by the Halifax Regional Municipality, known as HRM By Design, as part of its 2009 land use by-law. This document is a prescriptive guide for the design of buildings within the downtown district of Halifax, Nova Scotia. Included among its general rules for building heights, set-backs, function and articulation is a section specifically dedicated to the design of parking garages.[15] As a preamble to my design work, a graphic series is presented illustrating the a sequential, generic application of these rules to a garage design. Each plate indicates the guideline being observed, and poses a critical question of its architectural value.

Use level floor-plates to allow future repurposing.
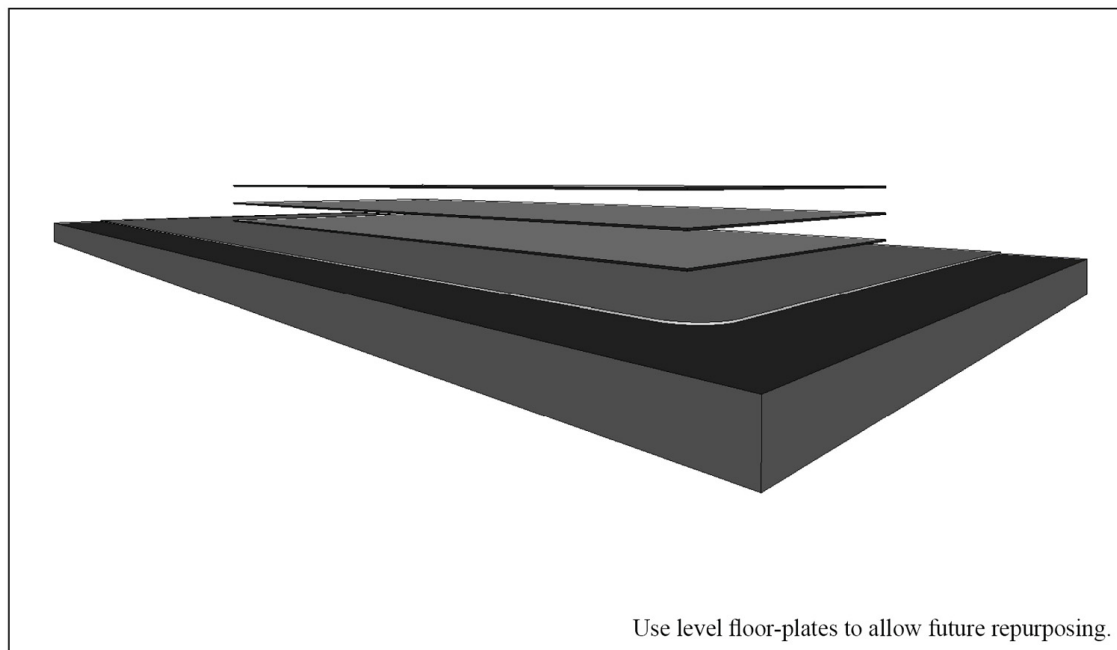
Figure 41. Questions: How are ramps to be dealt with internally? Can't the exposed ramp angle have compositional virtues?

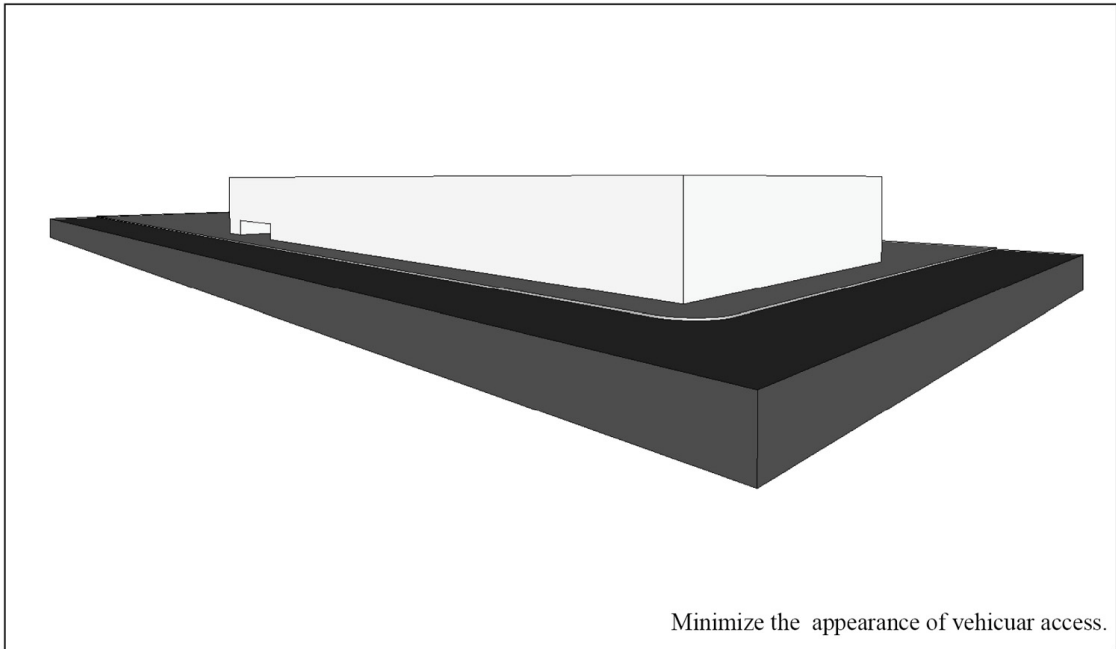Minimize the appearance of vehicuar access.

Figure 42. Question: Can't the entrance be made big and beautiful?

Hide utilities, mechanical and upper parking within the building envelope.
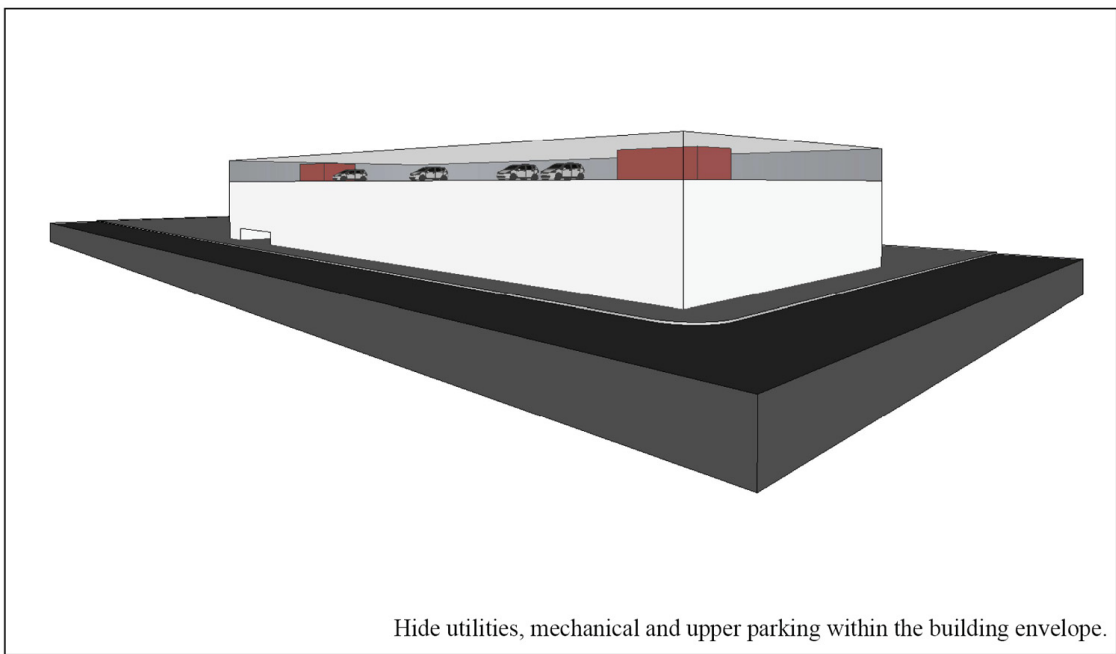
Figure 43. Question: Can this upper level instead be a shadow band?

Disguise rooftop parking with a cap.
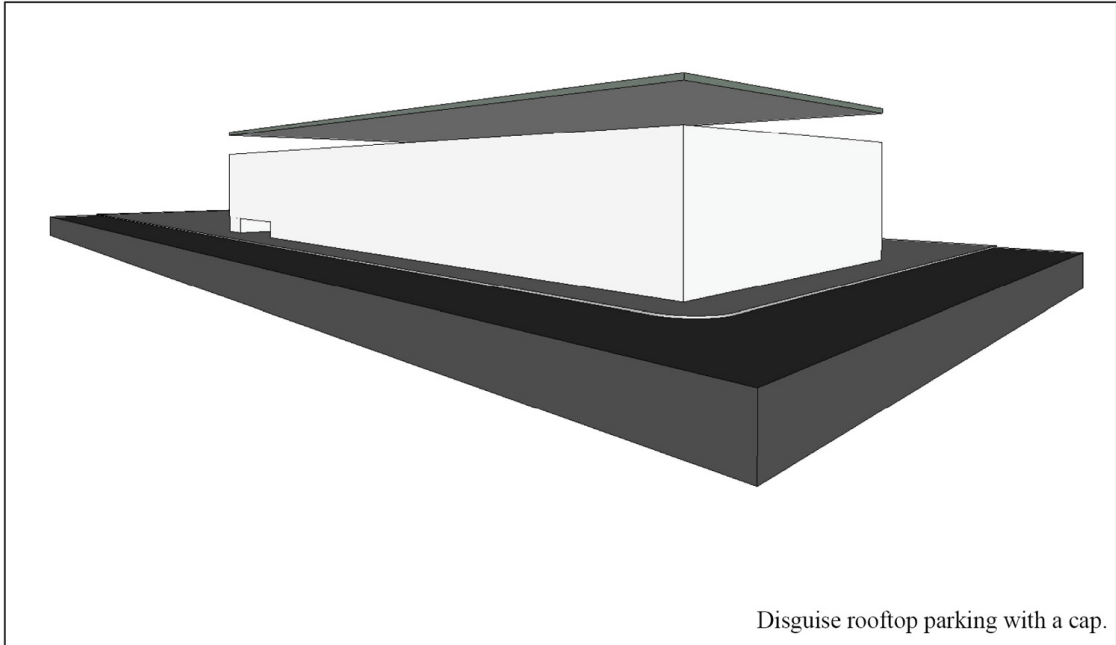
Figure 44. Questions: Is the parking surface necessarily ugly? What else can the canopy be?

Match downtown materials (ie, brick, stone and glass.)
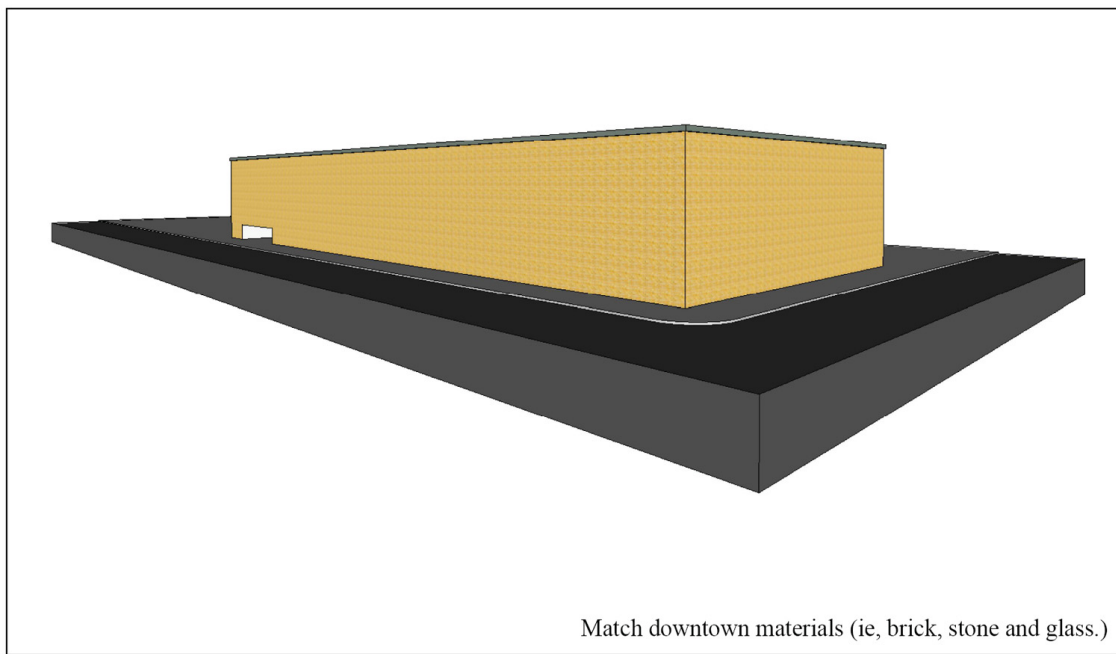
Figure 45. Question: How can 'prohibited' materials be made beautiful?

Articulate bays for "fine grained storefront appearance."
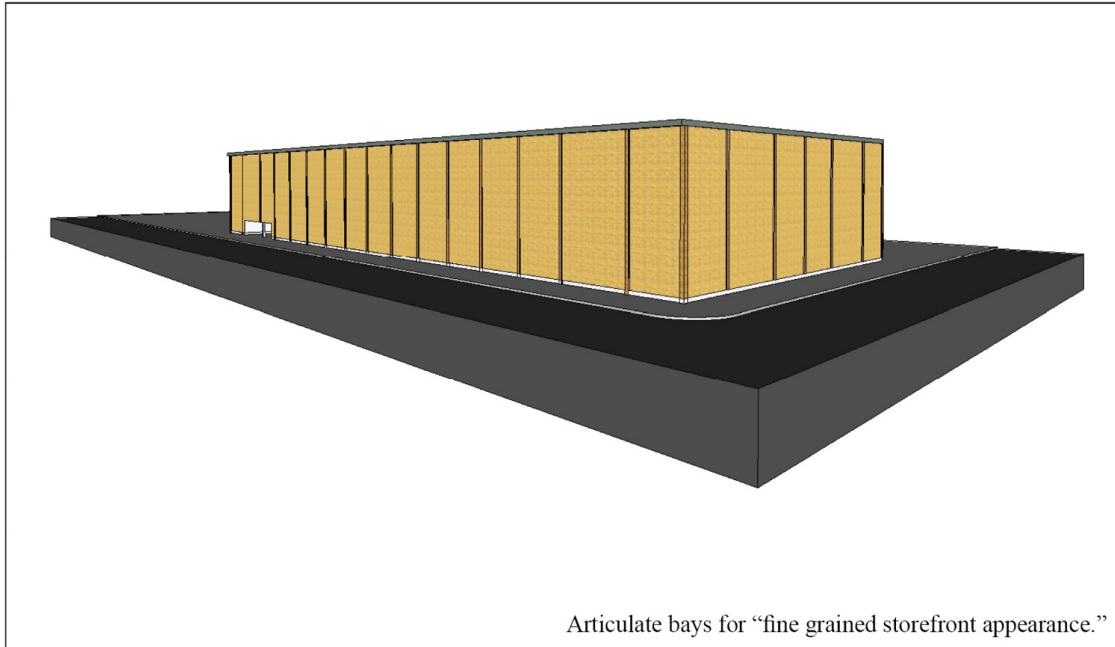
Figure 46. Questions: Do you need bays? Can't a big building be beautiful?

Retail should occupy the street frontage at ground level. Awnings provide pedestrian comfort.
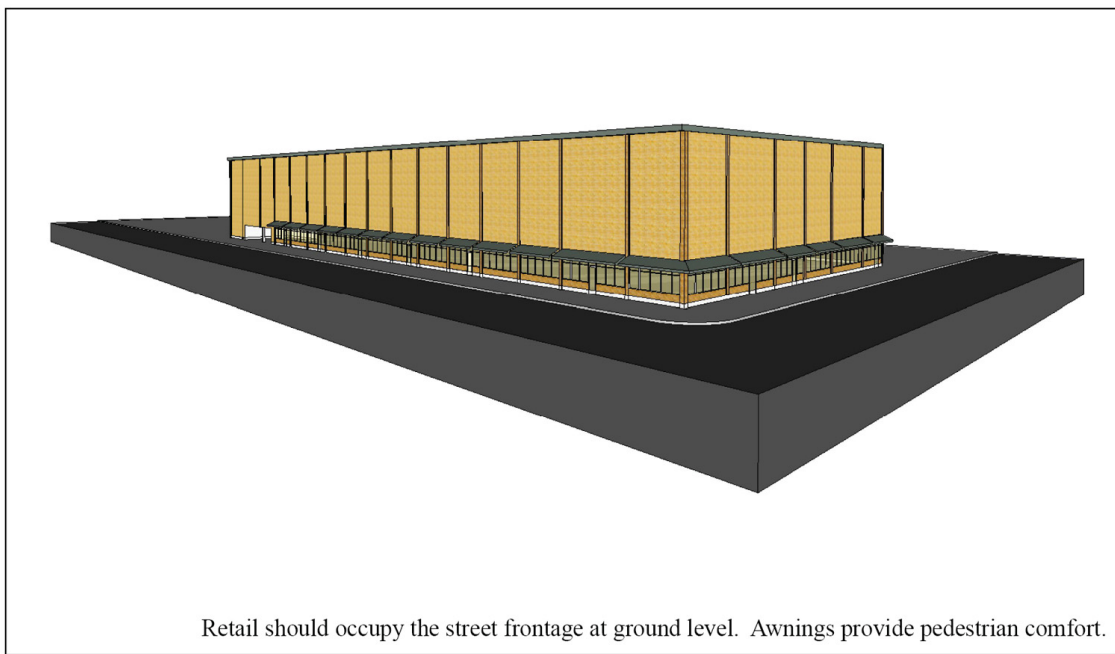
Figure 47. Question: Are there other pleasant streetscapes possible?

Entrances should be clearly defined. Stairs to be highly visible from the street at all levels.
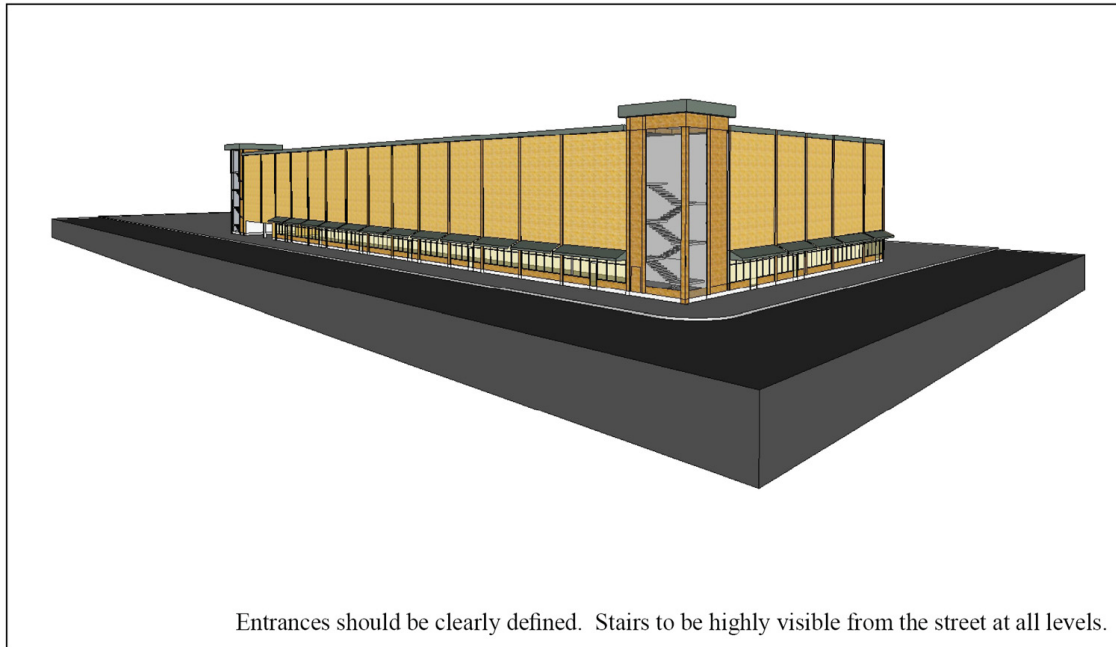
Figure 48. Question: Can't 'null corners' and implicit entrances be creatively compositional?

Conceal the parking levels, using 'window' openings to give the appearance of a multi-storey building.

Figure 49. Question: Are there no glazing / opening strategies other than 'windows'?

Design Site Overview - Metro Park Garage, Halifax, NS.
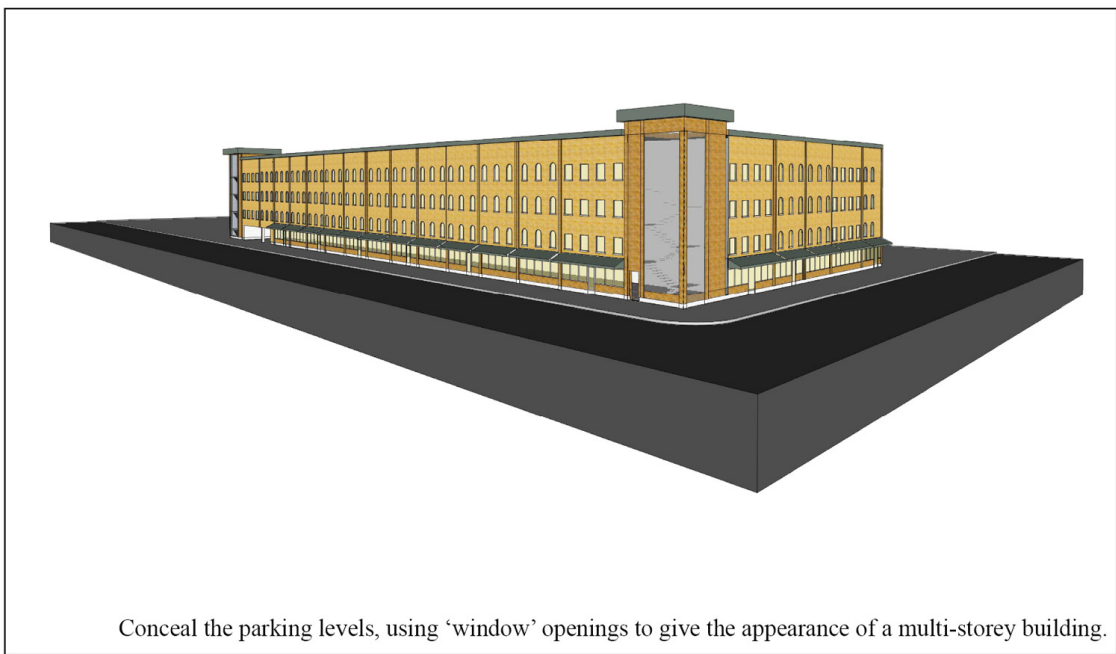
The Metro Park Garage is a municipally owned facility in downtown Halifax, Nova Scotia. Situated between Hollis St. on the East side, Granville St. on the West and Salter St. on the South, the garage sits among mid to high-rise commercial buildings in the core of Halifax's downtown business district. It rise five levels on its upper (Granville St.) side, and six and a half levels on the lower (Hollis St.) side, the difference arising from the pronounced East-West grade change as the land slopes downwards towards Halifax Harbour. A small commercial block ajoins the garage on Salter St.

The buiding is constructed using a pre-cast concrete double T deck system, whereby deck elements are suspended between a central shear wall and an exterior column-and-spandrel system. By way of ornamentation, a segmented pre-cast concrete arcade has been bolted to the main structure to provide a street-level articulation separate from the otherwise unmodified structural expression on the upper levels. Stair towers are integrated into the building's southwest and northeast corners, and a third is grafted (presumably by an off-lot extension) to the northwest corner.
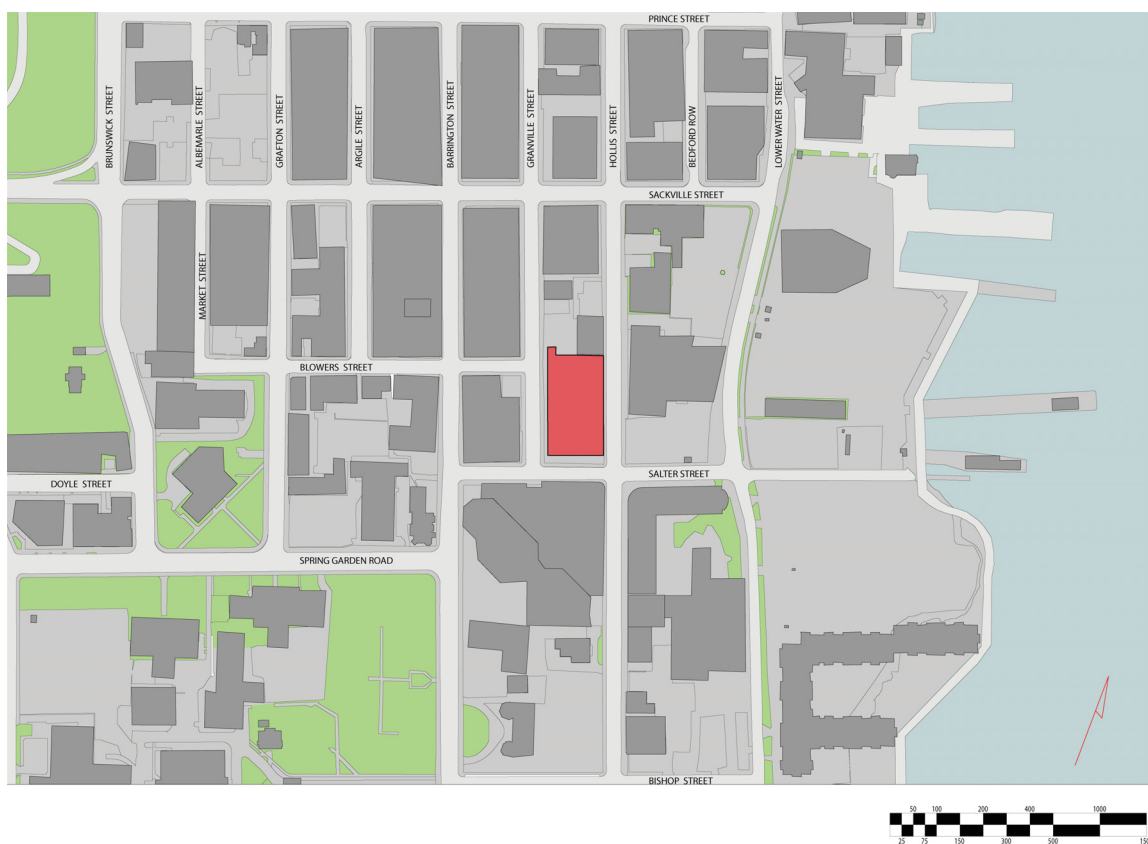

Figure 50. Site plan.

Figure 51. Granville St. facade.

Figure 52. Hollis St. facade.

An important design characteristic of this building is the expression of the deck ramping on much of the long facades on Hollis and Granville Streets. From an aesthetic point of view, this constitutes a disparity with the contextual geometries. This disparity is further accentuated by the horizontal / angular conflict produced by the overlay of the bolted arcade system.

Figure 53. Granville/ Salter commercial corner.

Figure 54. Entrance articulation on Granville St..

Figure 55. Associative vagueness occurs as geometries overlap.

Figure 56. Further geometrical discontinuity: coherent associations in the arch corners are ignored.

Figure 57. Detail of an existing arcade element, bolted proud of the structure.

CHAPTER 2: DESIGN

The design challenge implicit in the trajectory of this study was to devise a facade with a clear associative integrity, which has been shown to be lacking in the present configuration. The ramped decks along the long faces on Granville and Hollis Streets - an angular component at variance by just over 2 degrees with the horizon - produce the problem of indifferent association with the surrounding context, and with the rectilinear elements with which the facade has been dressed.

Telegraphing this skewed geometry are the 5' high spandrel elements which form part of the double T deck system. This is a precast concrete structural system whereby deck units with integral beams are hung between a central supporting shear wall and exterior slotted spandrels, which in turn are suspended from and bolted to a column grid.
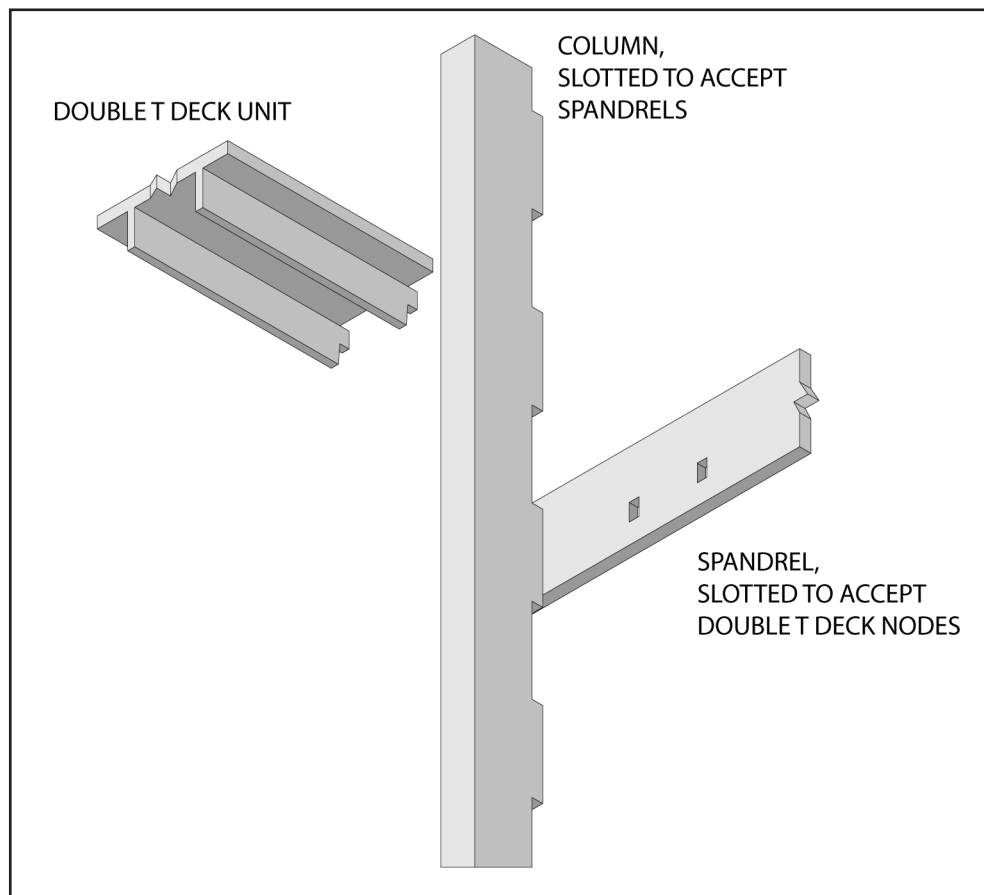

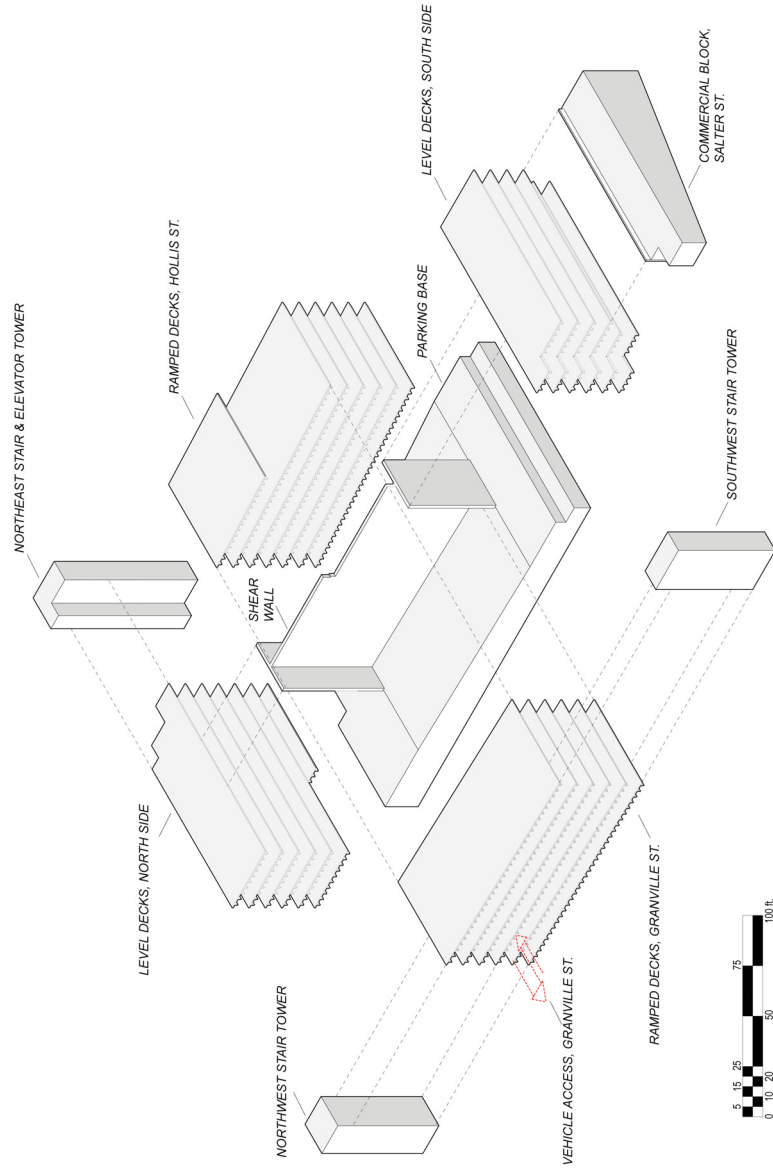Figure 58. Double T exterior wall configuration.

Figure 59. Exploded axonometric drawing of the garage, with spandrels and columns removed.

LEVEL DECKS, SOUTH SIDE

COMMERCIAL BLOCK, SALTER ST.

RAMPED DECKS, HOLLIS ST.

NORTHEAST STAIR & ELEVATOR TOWER

PARKING BASE

SOUTHWEST STAIR TOWER

SHEAR WALL

LEVEL DECKS, NORTH SIDE

RAMPED DECKS, GRANVILLE ST.

NORTHWEST STAIR TOWER

VEHICLE ACCESS, GRANVILLE ST.

5 15 25   75   100 ft.

0 10 20   50

I decided to pursue the possibility of maintaining the deck layout, but replacing the street wall components with an alternate system which could handle the structural requirements of the garage while playing down the heavy angular expression.

Figure 59 depicts the garage in its exploded state, with the exterior spandrels and columns removed. In reimagining a new facade treatment, I explored various methods of incorporating a system which could be both structural and sculptural. I settled upon a form inspired by the load-bearing logic of trees, whereby nodes at the deck ends could be picked up and loads transferred through "branches" to central "trunks" and down to the ground. This tree motif became, in game terms, my opening hand.
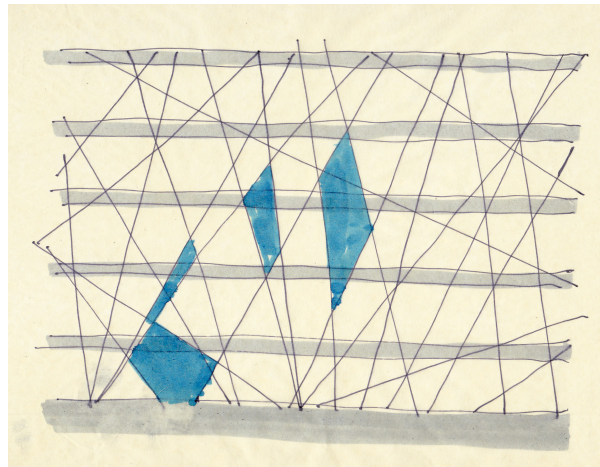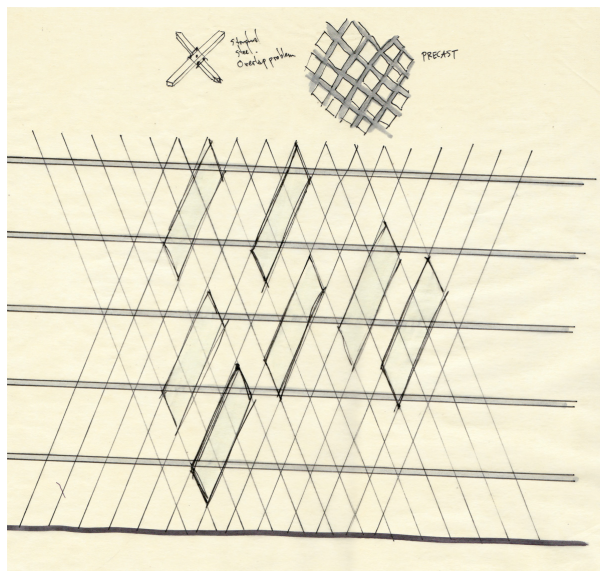

Figure 60. Structural sketch: free diagonals.

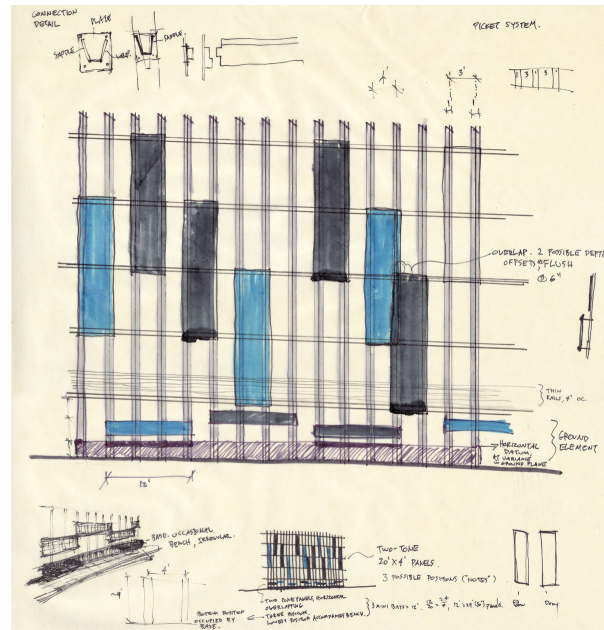Figure 61. Structural sketch: regular mesh.

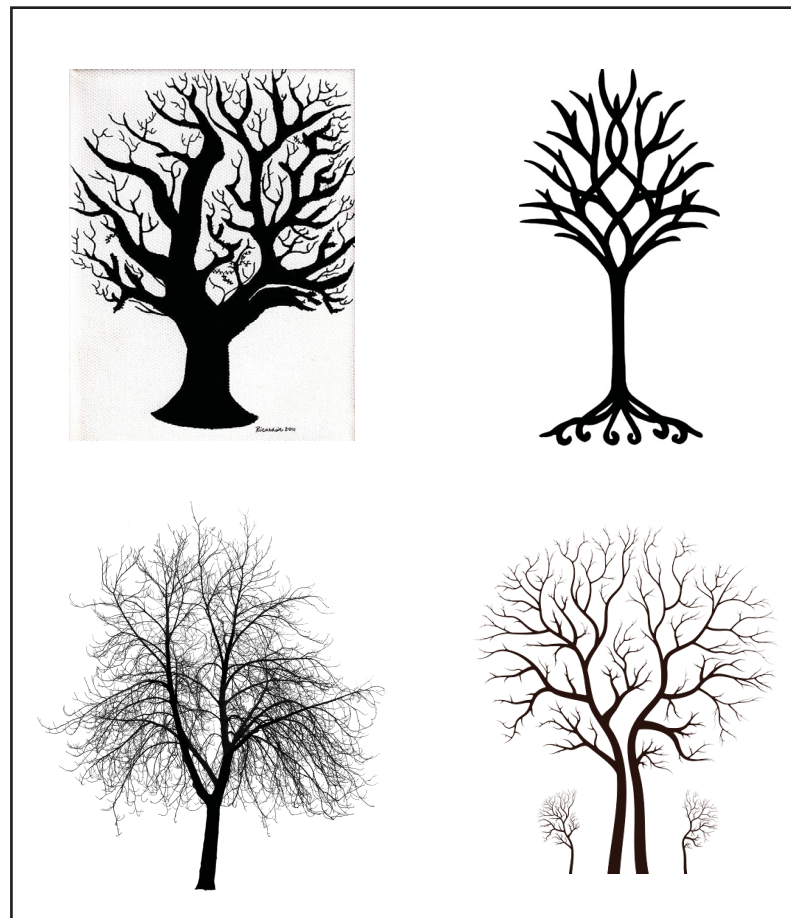Figure 62. Structural sketch: colonnettes with panels.

Figure 63. Formal inspirations: two dimensional tree renderings. Zen Sumi Tree of life. From Fine Art America. Tree drawing. From Alley Cat Scratch. Tree silhouette. From Lulu. Vector Tree. From Dragonartz.
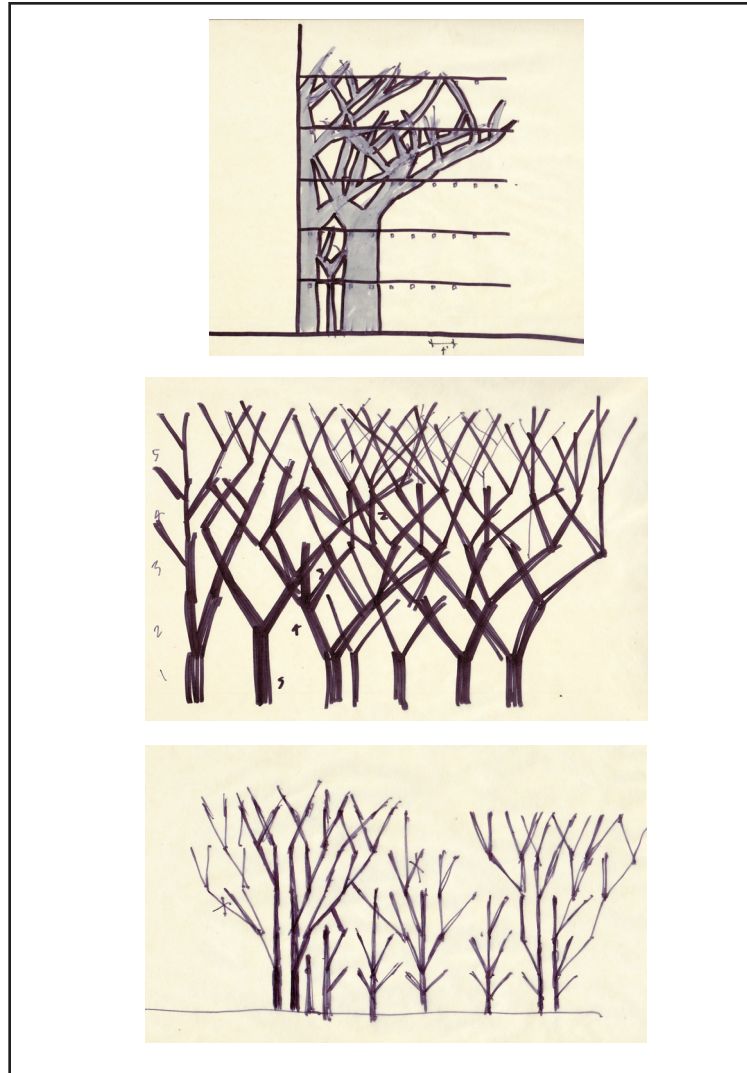
Figure 64. Searching for a system.

Searching for a method to systematically pick up all of these nodes, I arrived at a two-layered configuration, wherein a front and back course of corten steel tree structures, welded to one another to form a diaphragm, carry the deck nodes by means of stainless steel brackets. Load is transferred downwards, as shear is picked up from the central concrete wall.

The geometry of the tree system followed distinct rules, such as branch angle, common terminal dimension and taper angle. At the skyline, branch ends were datumed to a series of arcs, determined by heights of a major front tree element, and offset from the 22m (75ft) view plane height restriction.

Where this system ceased to be structural, namely at the stair towers on Granville and

Hollis Streets, exceptions were made to the otherwise consistent rules of branching and trunk spacing. Tower edges became new datum points for trunk centres, and trunk spacing changed rhythm in order to evenly fill the intervening space.

At the entrances, there was the need to introduce exceptionality to the system, as three lanes of vehicle traffic needed to be preserved. Trunks were therefore lifted from the
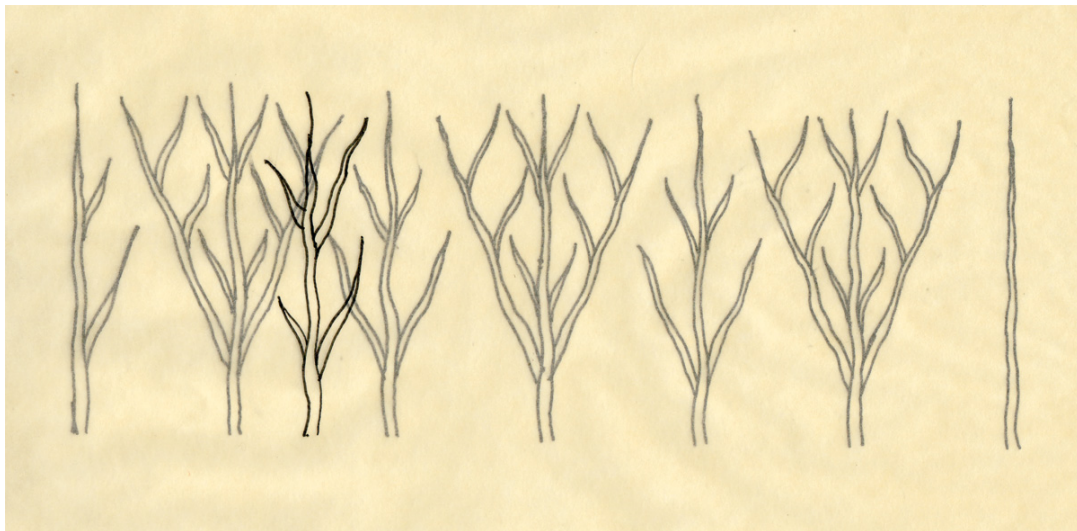

Figure 65. Corten steel sculpture. From Flickr.

Figure 66. Tree overlap study sketch.

BRANCHES THICKEN
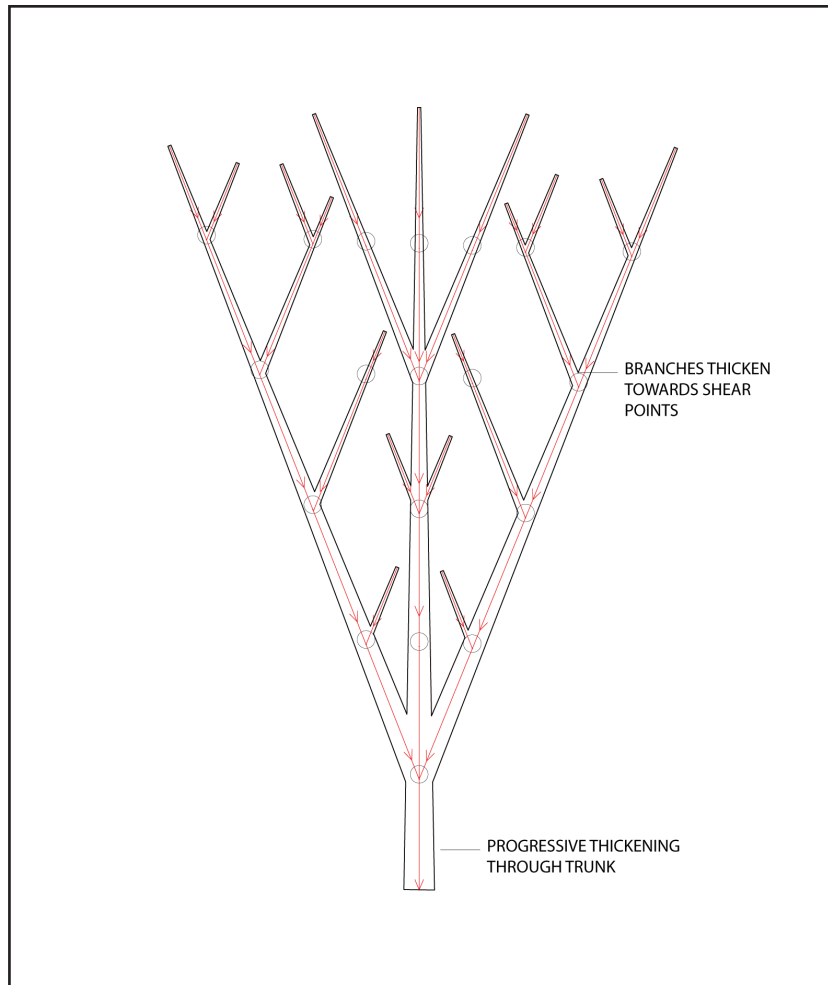TOWARDS SHEAR
POINTS

PROGRESSIVE THICKENING
THROUGH TRUNK

Figure 67. The logic of the tree structure.

ground, and a variation of the branch meshing was implemented.

The Salter St. facade posed a unique design challenge, as there was no structural neces-
sity for the tree system. Hence, I opted for a figure ground inversion, where the branch-
ing structure was replaced by corten steel plates, describing the void space which would
otherwise have been created by the interlacing branches.

The corner condition between the tree-lined faces and the figure ground face was dealt
with by interleaving the branches and plates, allowing them to protrude past one another,
and creating a distinct contrasting associative moment in the facade.

The commercial block on Salter St., given it's separate physical and programmatic char-
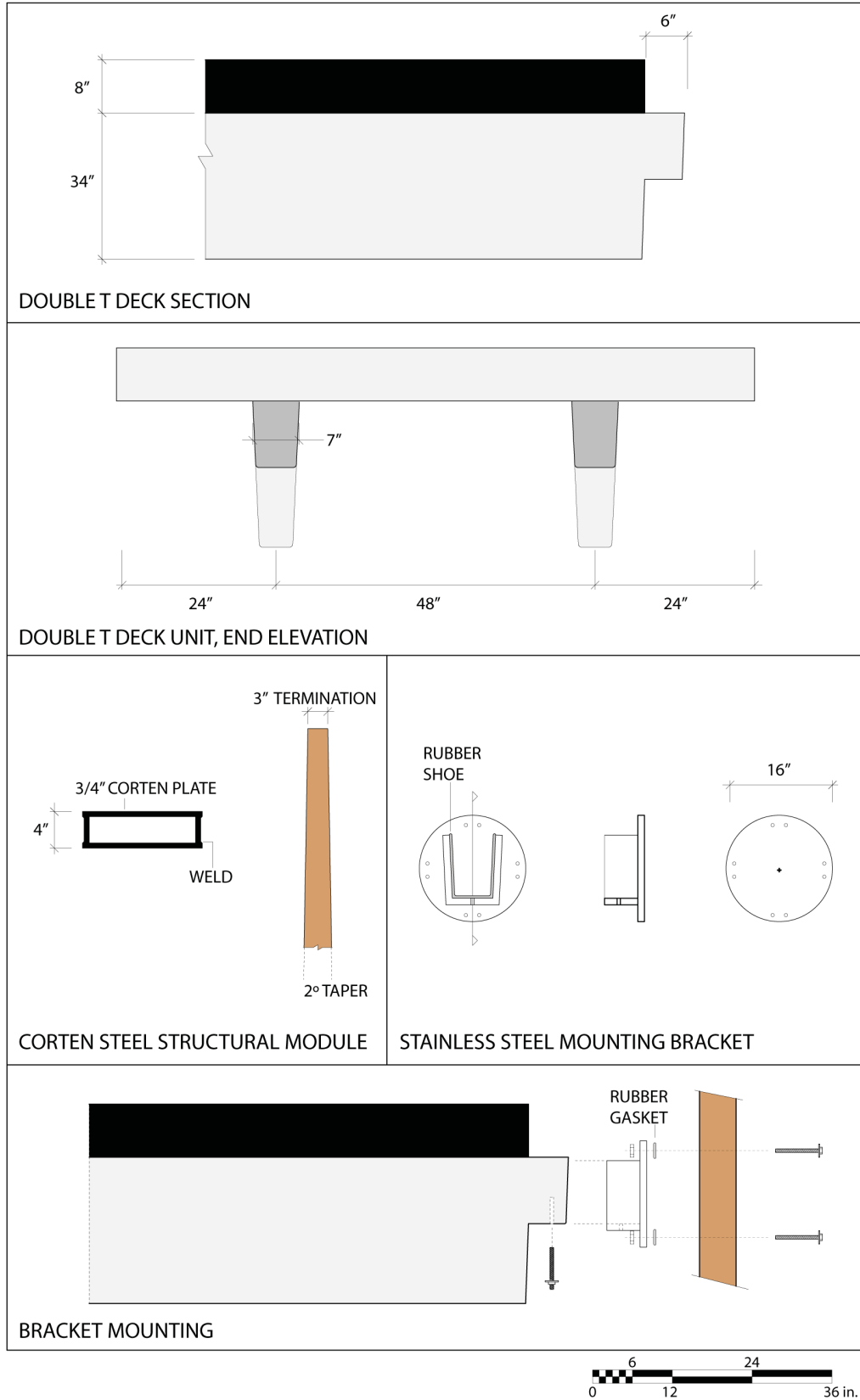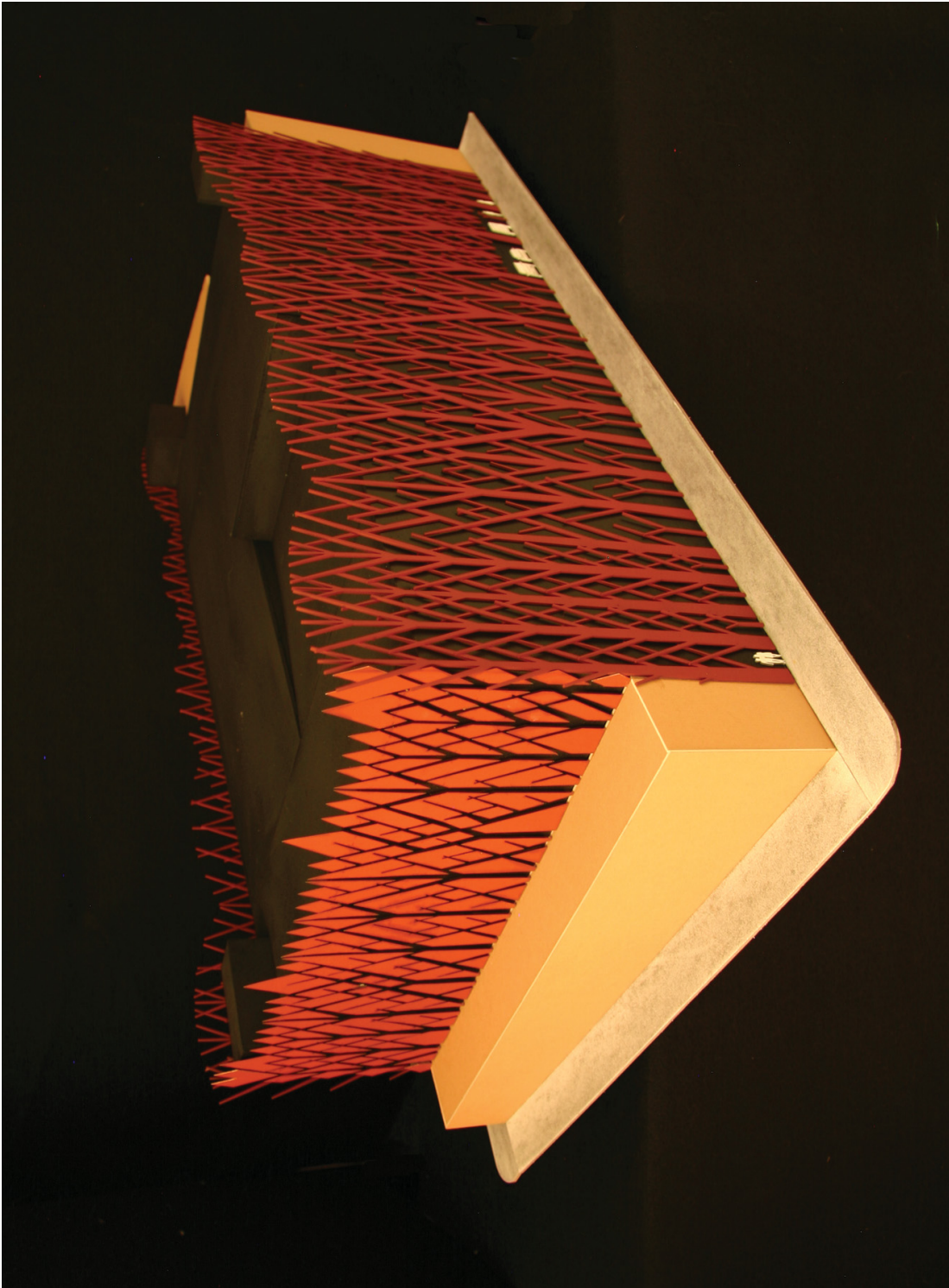acter, was excluded from the parking garage facade design.

DOUBLE T DECK SECTION

8"

34"

6"

DOUBLE T DECK UNIT, END ELEVATION

7"

24"   48"   24"

CORTEN STEEL STRUCTURAL MODULE

3" TERMINATION

3/4" CORTEN PLATE

4"

WELD

2° TAPER

STAINLESS STEEL MOUNTING BRACKET

RUBBER SHOE

16"

BRACKET MOUNTING

RUBBER GASKET

6   24

0   12   36 in.

Figure 68. Details.

Figure 69. Model of the new facade.
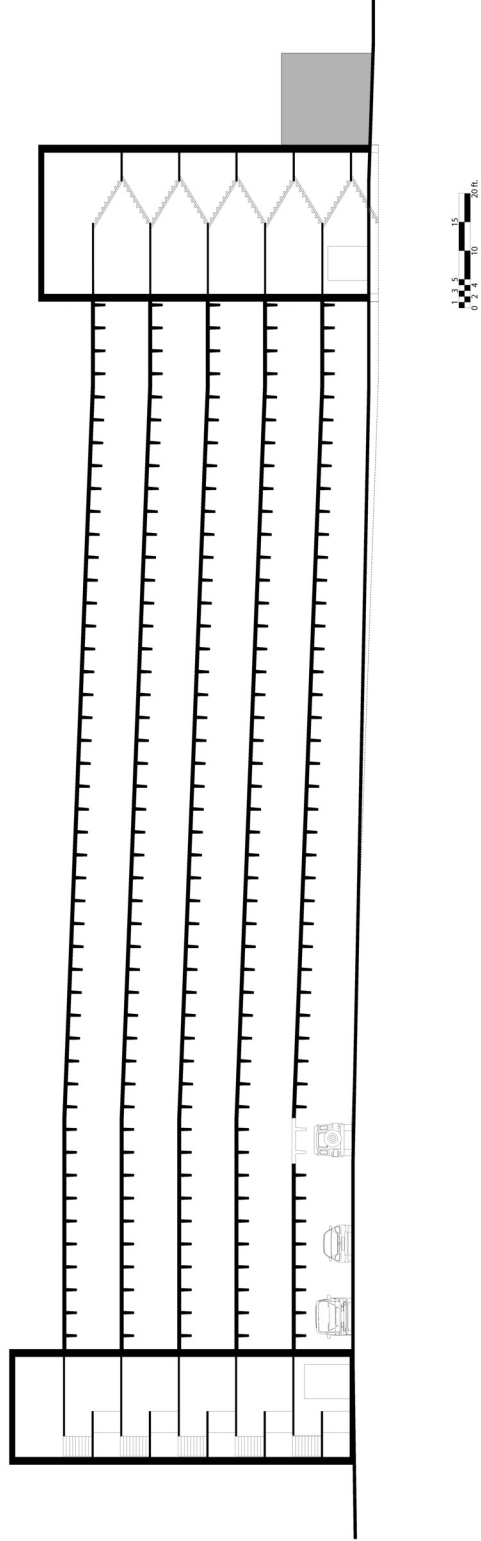
Figure 70. Section at Granvile St.

59

Figure 71. Tree course determination at Granville St.

PLANE OF SALTER ST. FIGURE GROUND INTERLEAVING
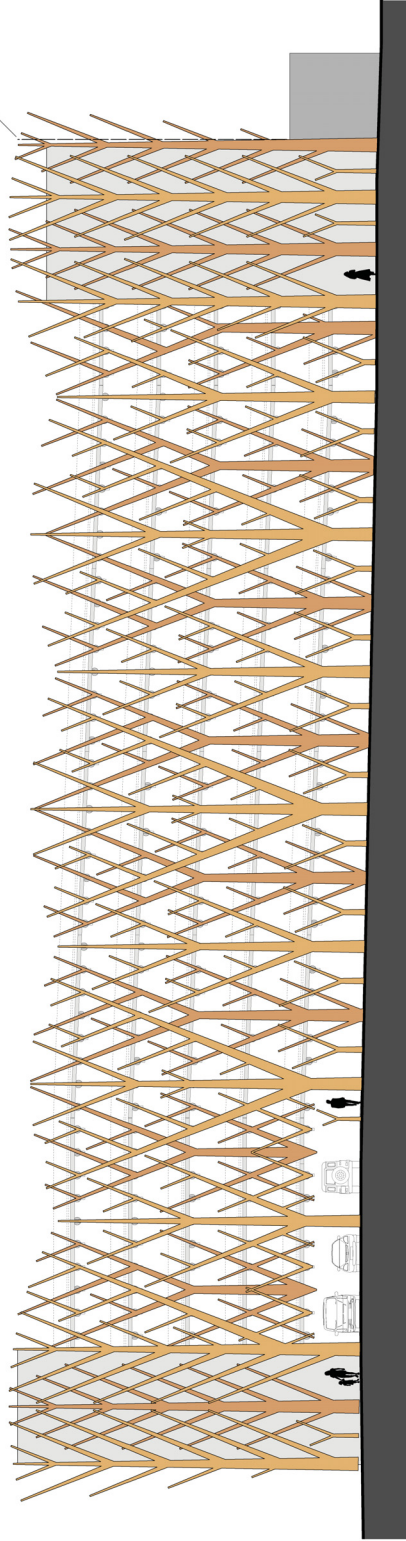
Figure 72. Final facade at Granville St.
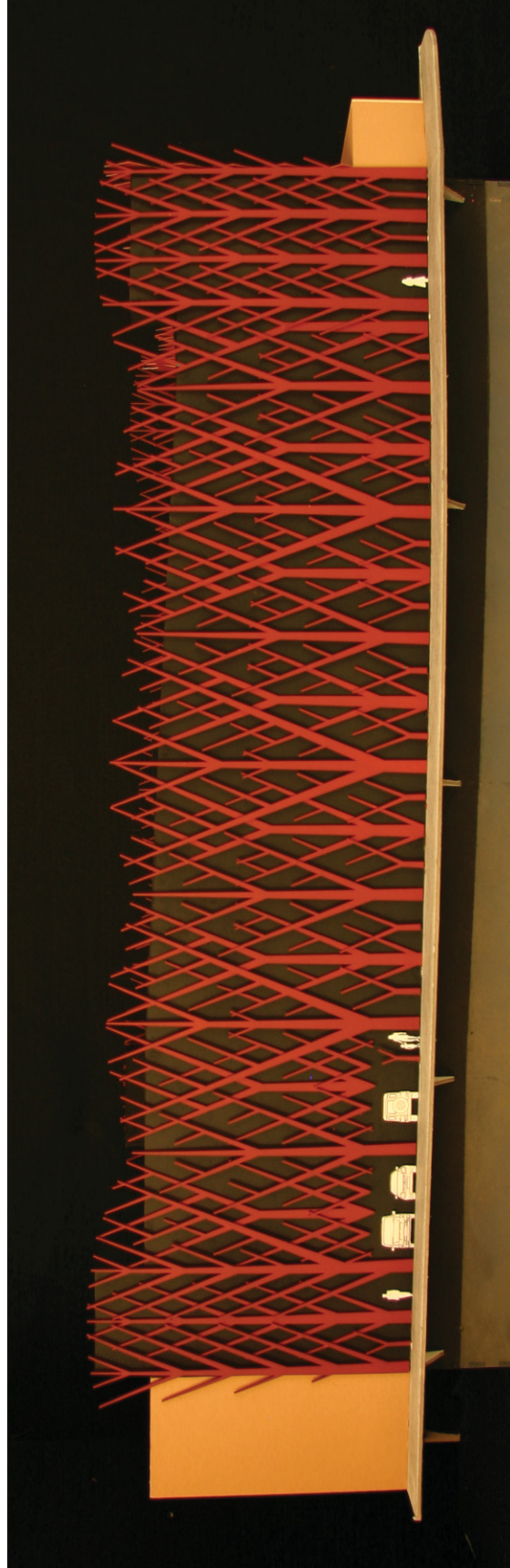
Figure 73. Granville St. facade.
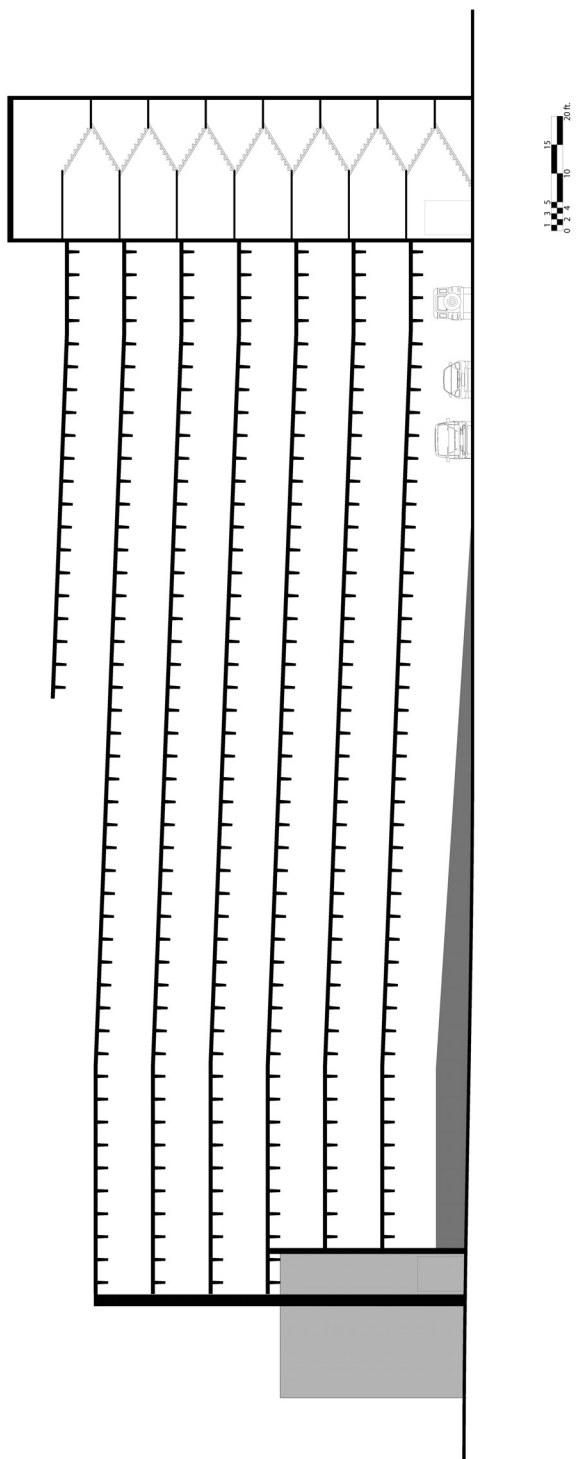
Figure 74. Section at Hollis St.

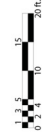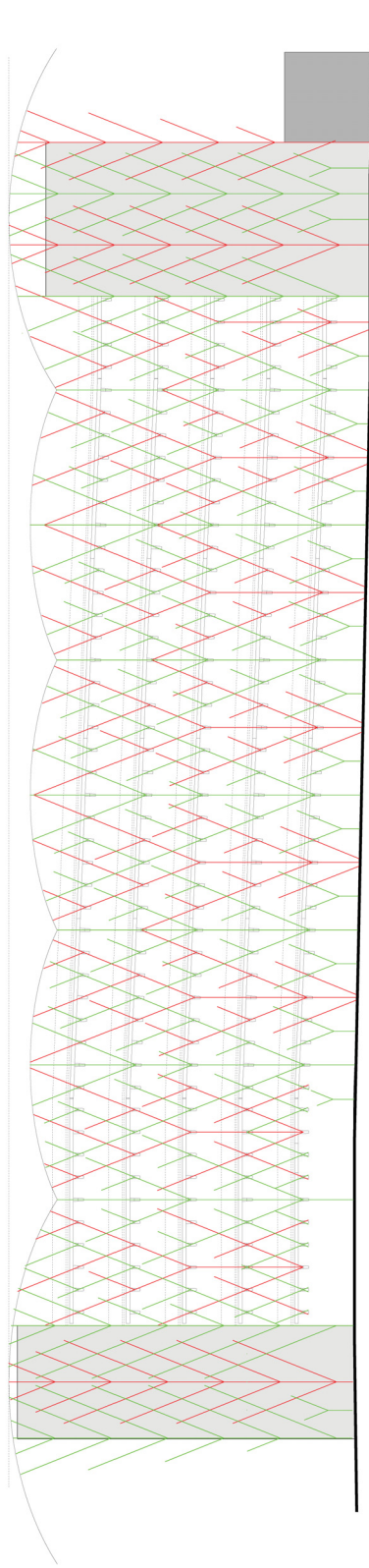**Legend:**

⋎ - SPINES FOR FRONT STRUCTURAL COURSE

⋎ - SPINES FOR REAR STRUCTURAL COURSE

0 2 4   5   10   15   20 ft.
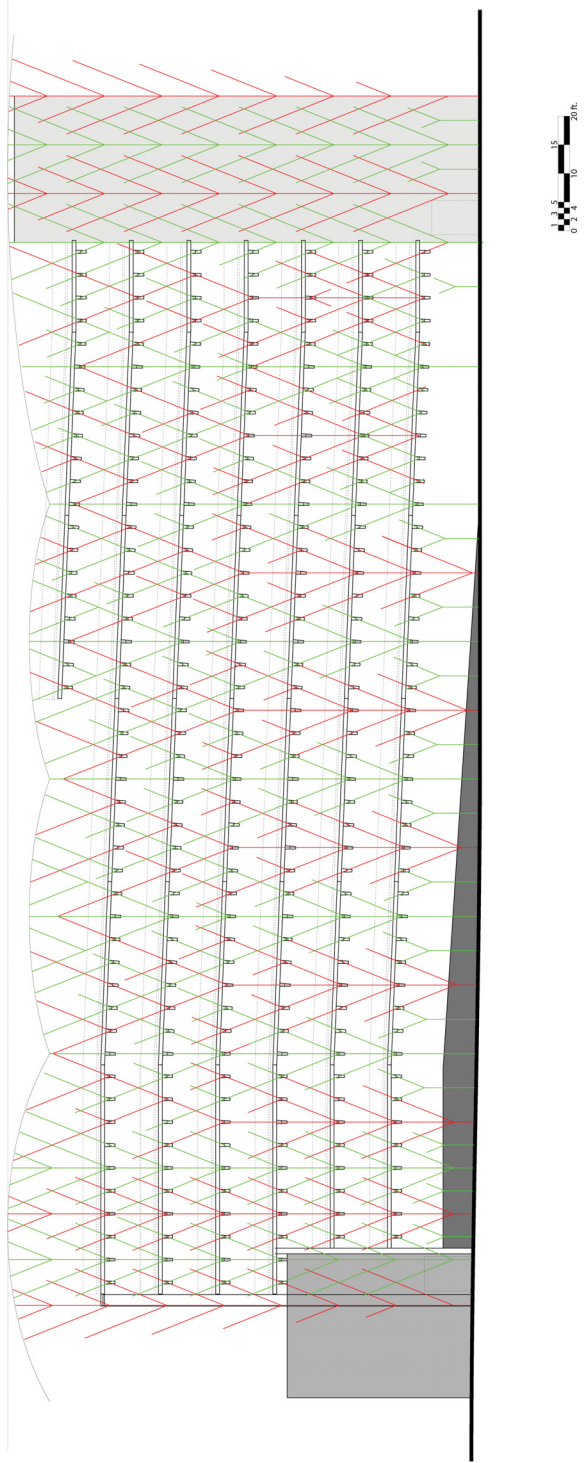
Figure 75. Tree course determination at Hollis St.

PLANE OF SALTER ST. FIGURE GROUND INTERLEAVING
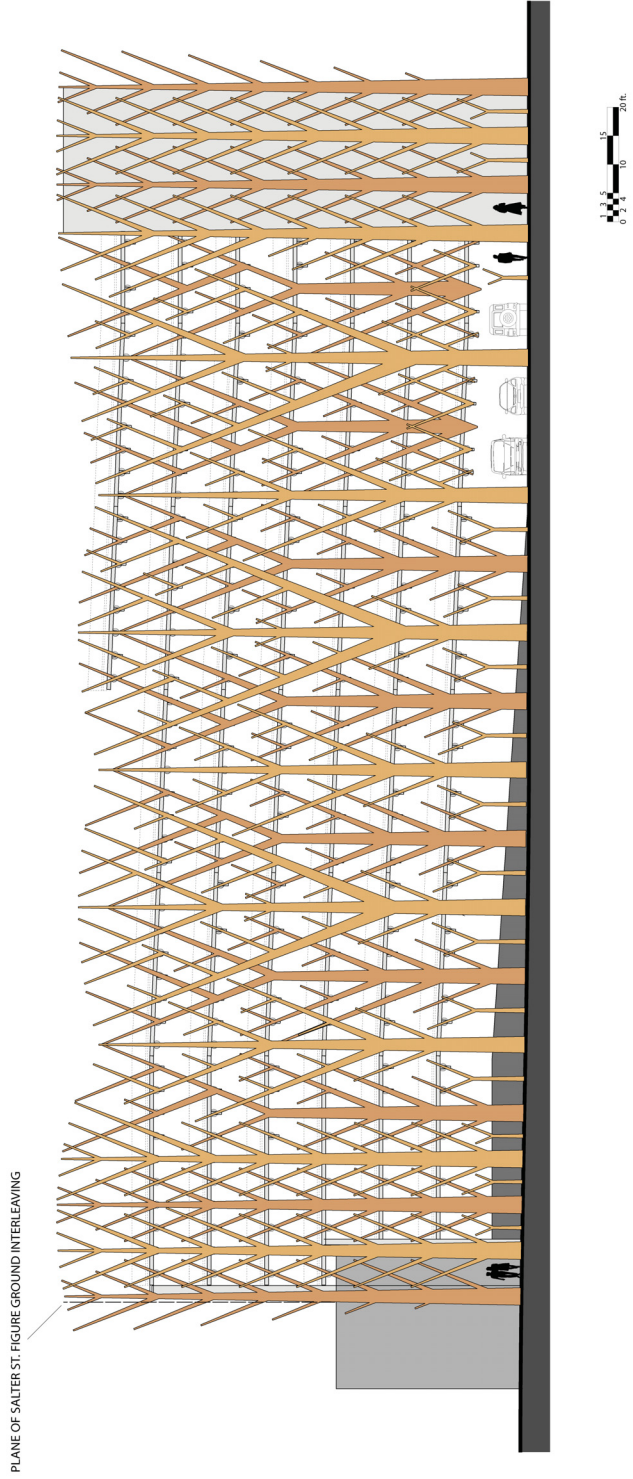
Figure 76. Final facade at Hollis St.
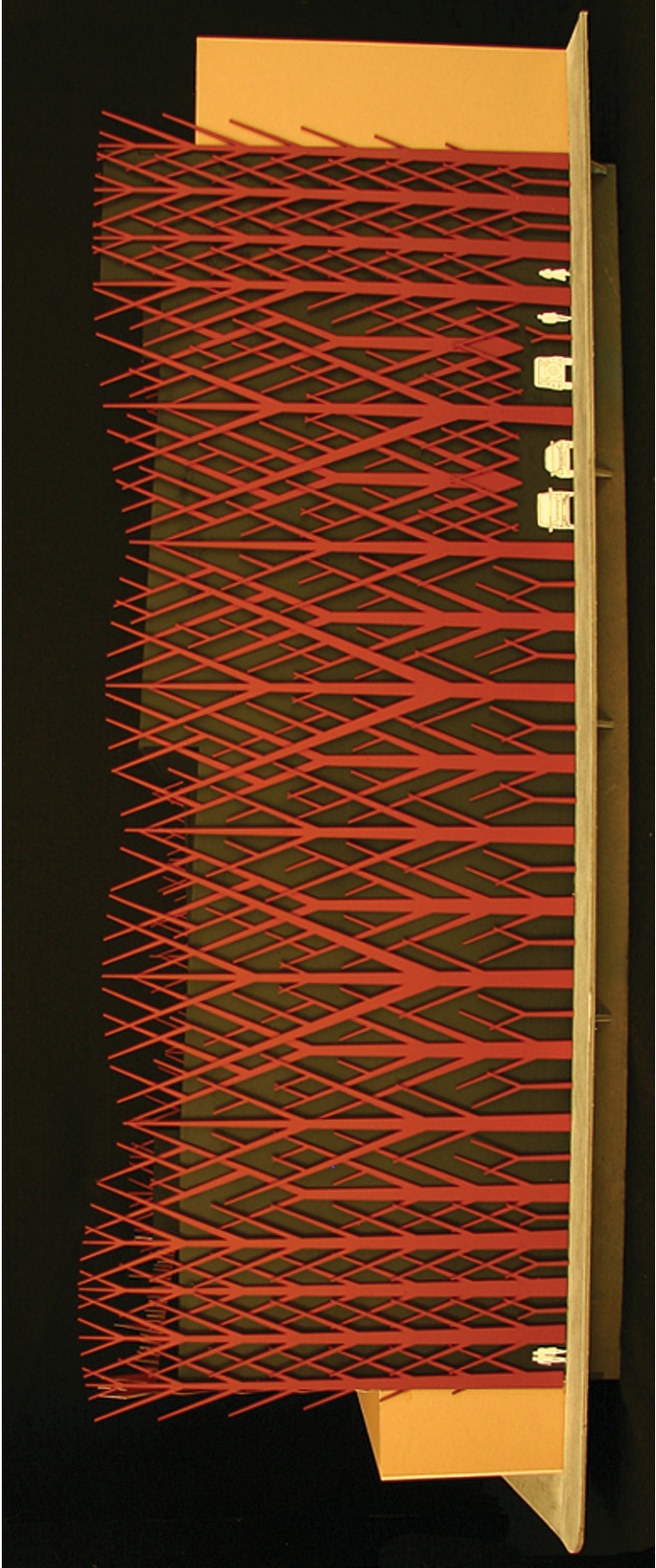
Figure 77. Hollis St. facade.
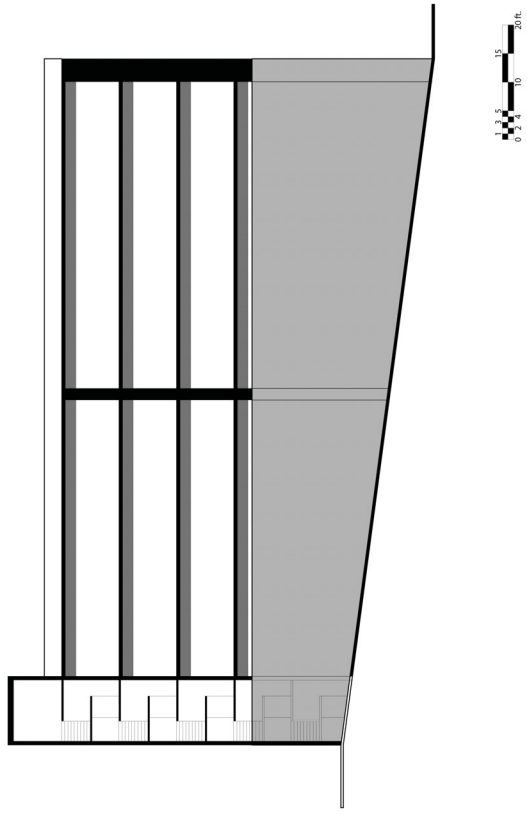
Figure 78. Section at Salter St.

"GHOST" TREE COURSE
FOR FIGURE GROUND GENERATION
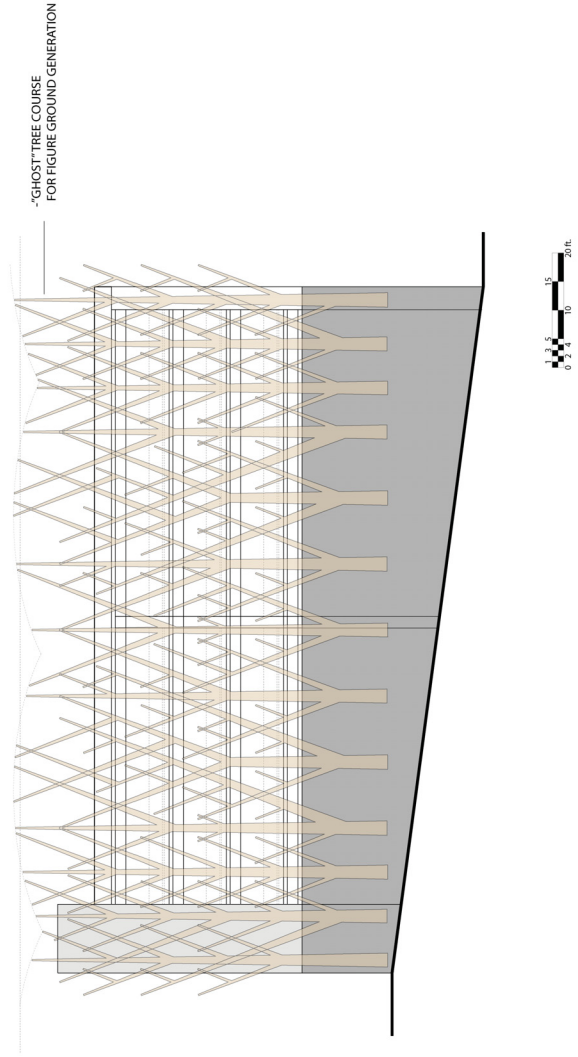
Figure 79. Tree pattern for figure ground generation.

HOLLIS ST. BRANCH INTERLEAVING

GRANVILLE ST. BRANCH INTERLEAVING
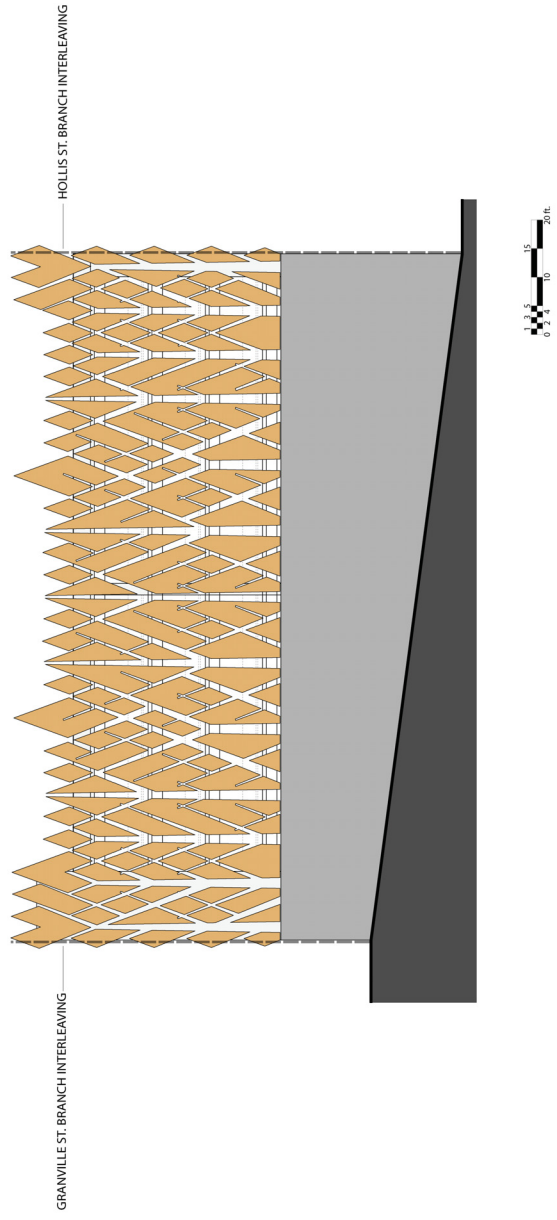
Figure 80. Final facade at Salter St.
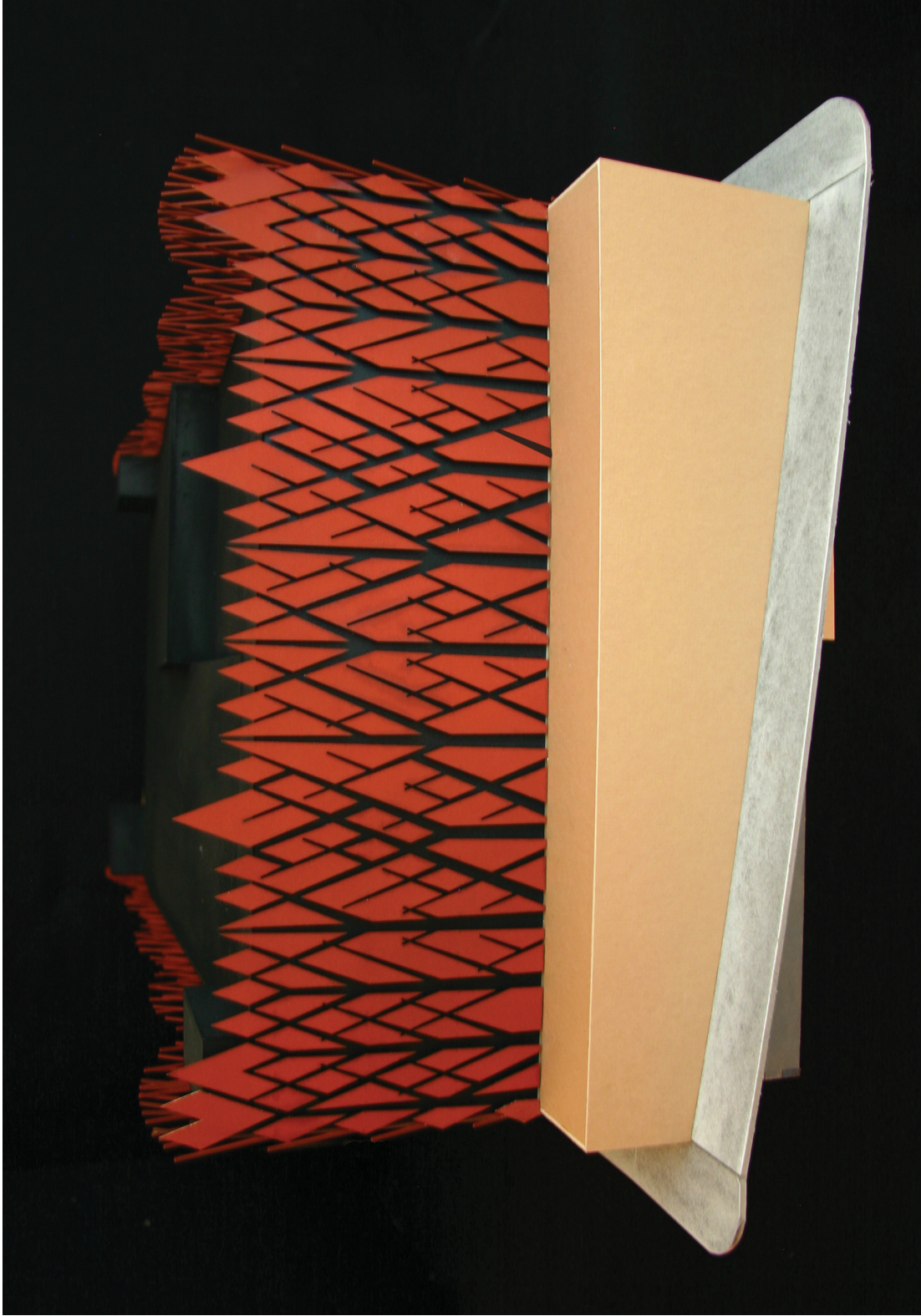
Figure 81. Salter St. facade.

72' (22m) HEIGHT LIMIT

45"

MID-SPAN ARC DEFINITION FROM MAJOR FRONT TREE

18"

12"

75"

SAME-LAYER BRANCH
COLLISION OFFSET

EXTENSION AT OVER/UNDER
BRANCH TERMINATIONS

SINGLE BRANCH TERMINAL
EXTENSION BETWEEN
DECKS
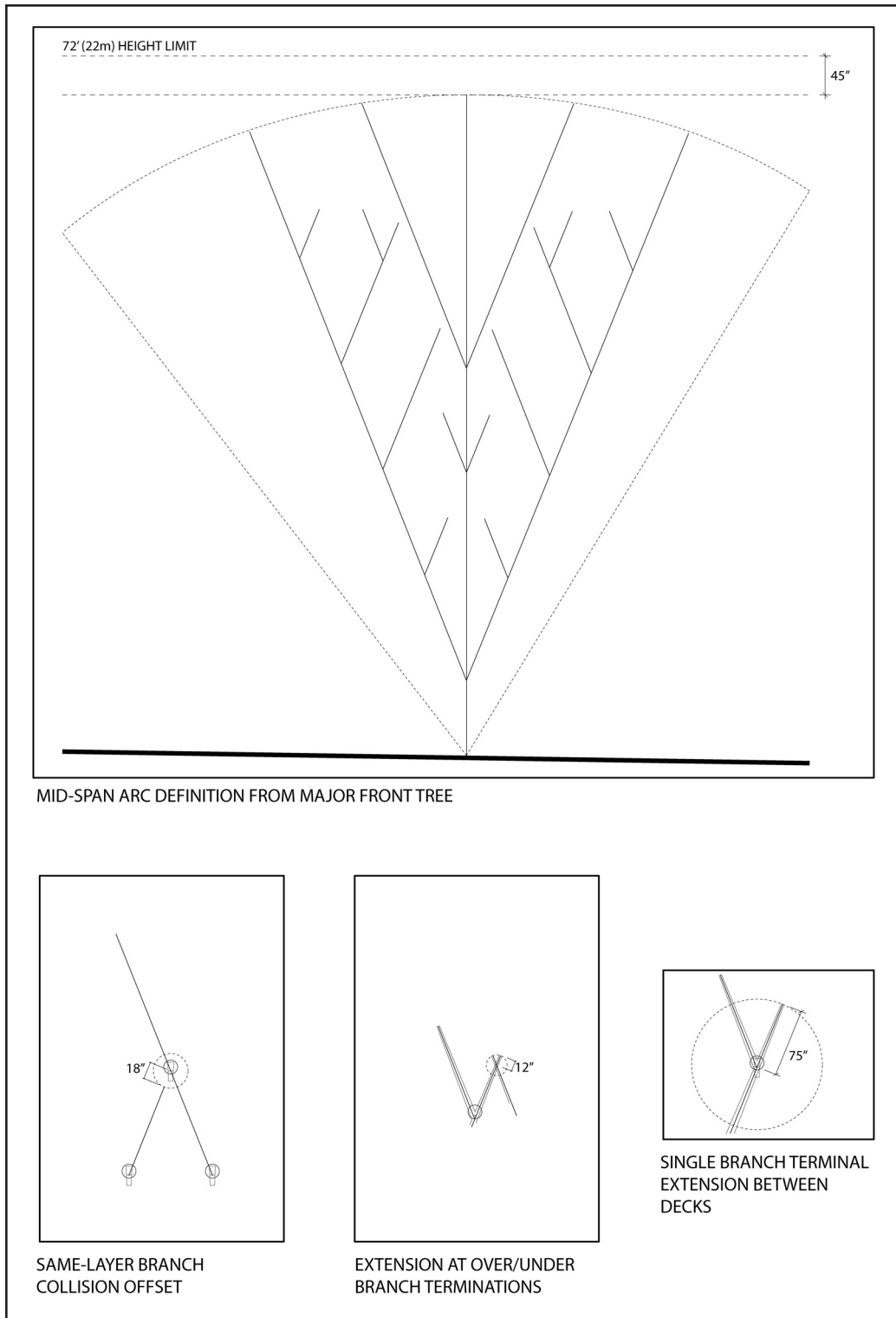
Figure 82. Drafting rules, part 1.

REAR COURSE FORKED TRUNK
GIRTH DETERMINATION

SAPLING TRUNK
GIRTH DETERMINATION

18″
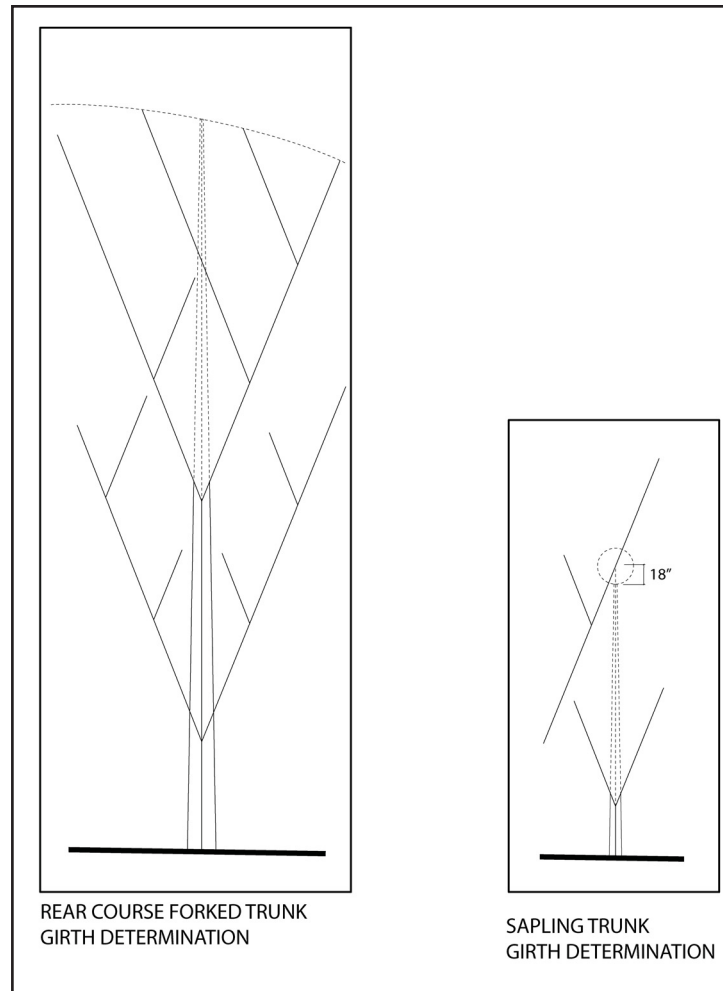
Figure 83. Drafting rules, part 2.

Figure 84. Partial model of structure / deck articulation.

Figure 85. Model detail.
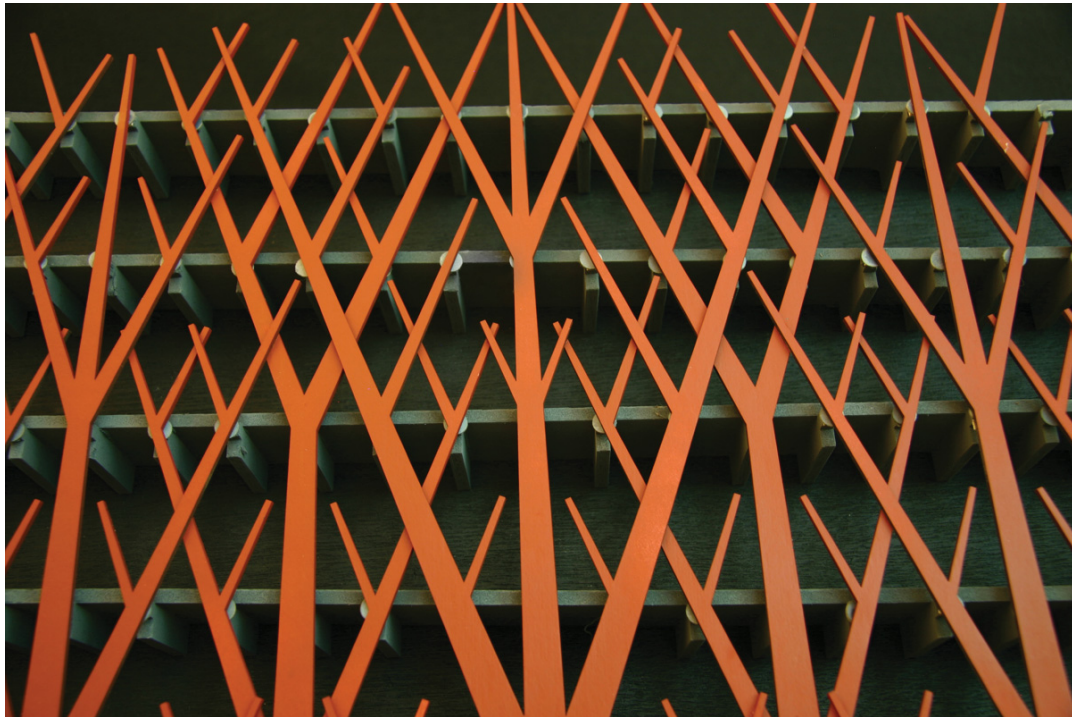
Figure 86. Model detail.

GRANVILLE ST.

SALTER ST.

12" PANEL OFFSET FROM WALL FACE

1 3 5   15
0 2 4   10   20 ft.
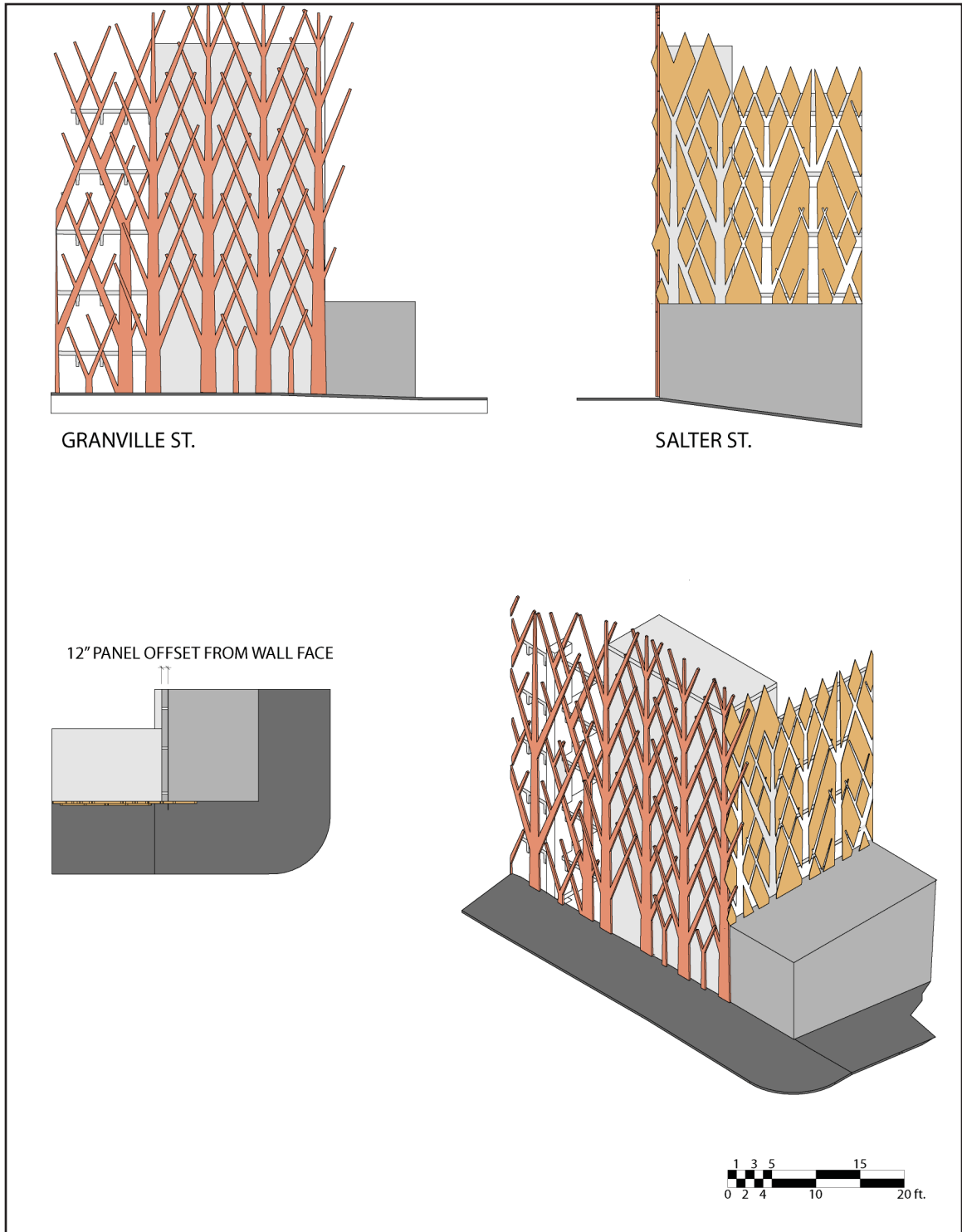
Figure 87. Corner detail. Interleaving as branches meet figure ground plates.
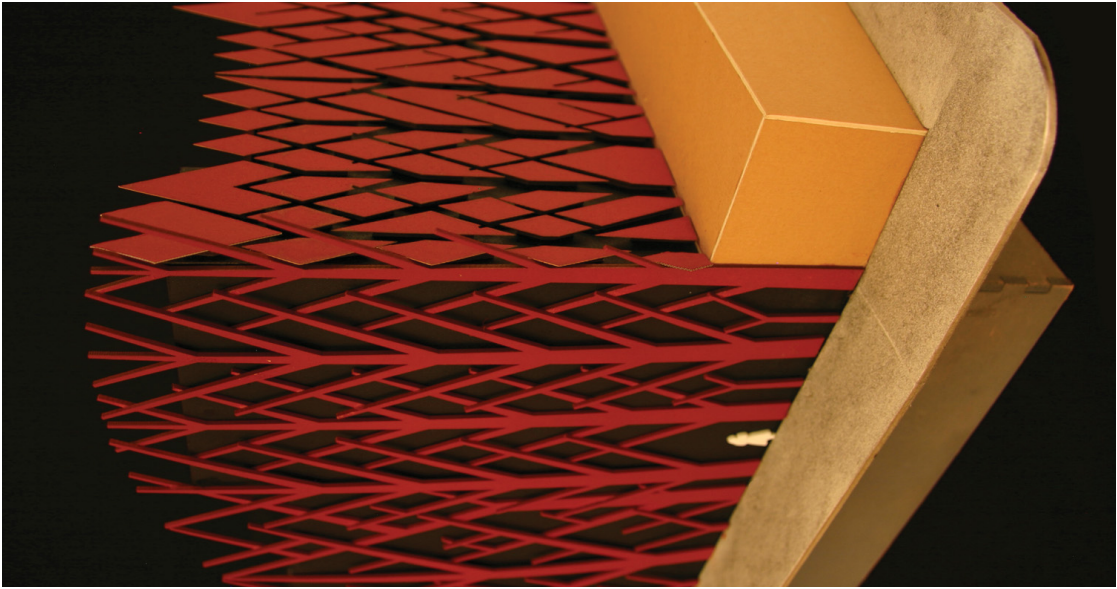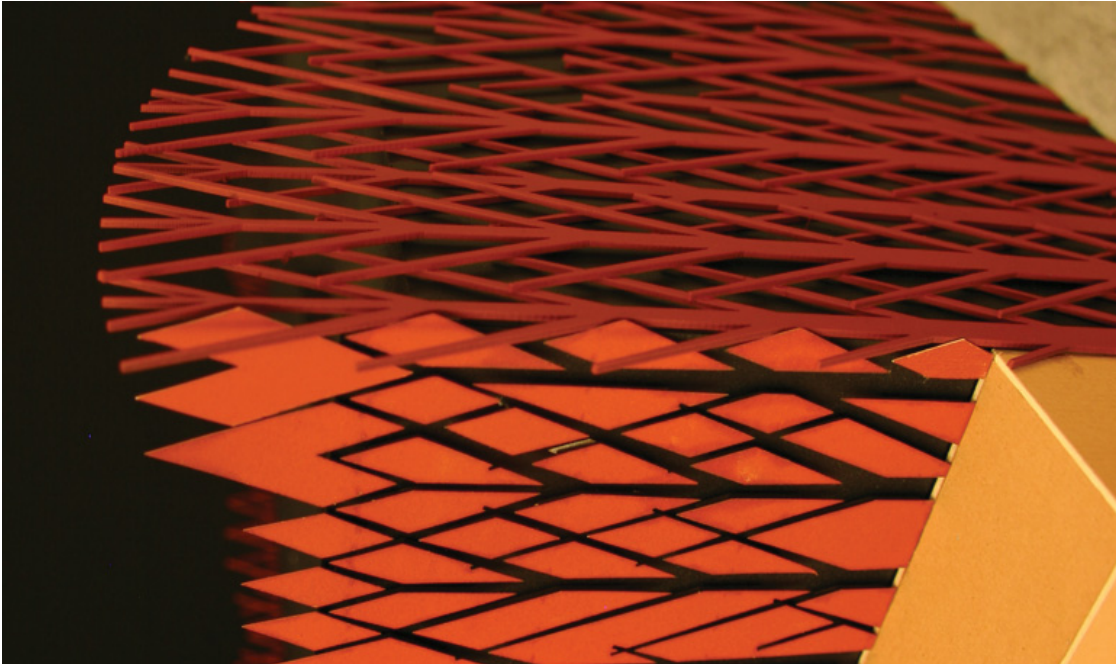
Figure 88. Details at corners: Granville & Salter; Hollis & Salter.
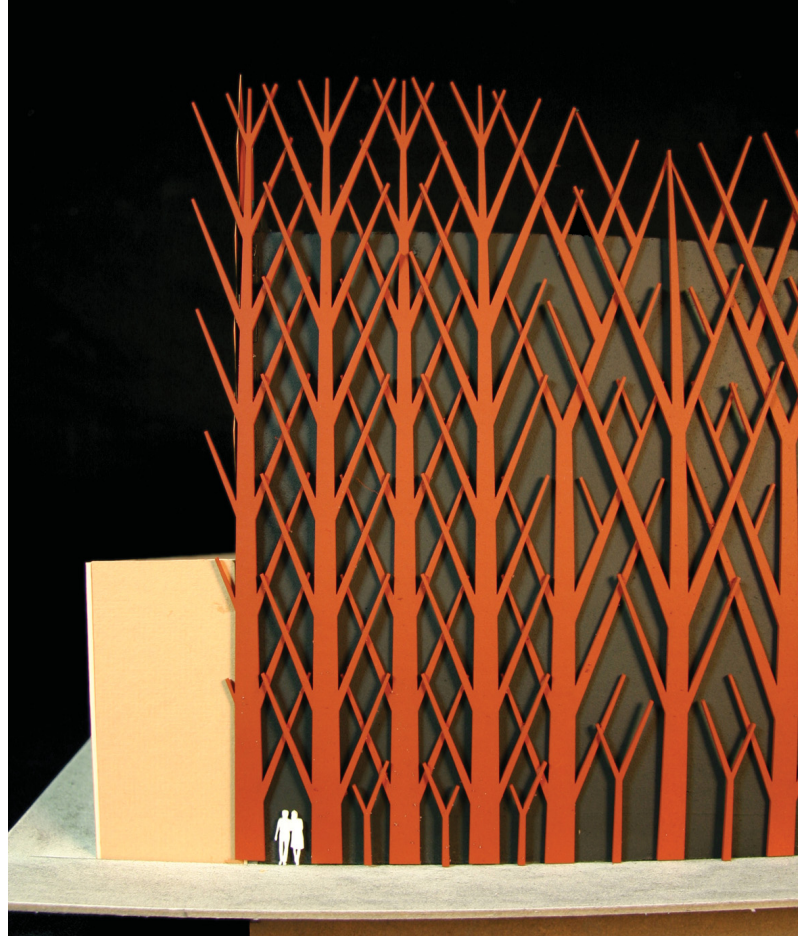
Figure 89. Rhythm changes at wall ends.

Figure 90. Entrances and exits occasion exceptionality in the composition.

CHAPTER 3: CONCLUSION

I began this investigation by questioning how a methodology of associative analysis could be incorporated as a generative approach to architectural design. Having pursued this question through the preceding case studies and design work, and other tangential investigations not presented herein, I've come to believe methodical handling of associative organization is valuable, perhaps essential, as a decision-making tool. However, organization can only act upon real form, defined objects and nameable elements. Whether these arise from the creative spirit of the architect or from structural, functional or material imperatives, they remain beyond the generative scope of purely organization-based modelling.

In the course of this study, there arose frequently the question of whether an associative configuration could be judged "good" or "bad" solely on the merits of its organizational characteristics, without specific reference to form. For instance, could a composition of low element density, high associative density and low exceptionality be judged as a success or failure without seeing its actual formal expression? What I discovered is that while modes of association form an important organizational layer, composition depends on the formal characteristics of elements.

What may be safe to assert, though, is that whatever the design proposition an architect chooses to make, it is the *clarity* of association which ultimately can be judged as having or lacking merit. Clear similarities, clear contrasts, clear physical relationships make more satisfying compositions than vaguely associated or differentiated ones. The difference is between focussed and intentional design, and the architecture of indifference. Clarity does not contradict such concepts as Venturi's "double functioning element" or the emergence possible in ambiguity, but underlines that such phenomena arise from compositional rigour.

If this is the case, then it suggests that improvements may be made to building guidelines such as HRM By Design, where merit is specifically attributed to constraining element density and exceptionality, and to breaking large volumes into smaller ones. An emphasis on depth of composition could better underpin such regulations, and permit a broader range of invention and expression to the architect.

Lastly I will make a technical observation on drafting the final garage facade design. The proposed tree structure can be described as a composition of low element density (given the consistent module of the tapered steel members), high associative density (relying upon a consistent rule-based organization of these members), and high exceptionality within certain associations, as the specific associations between members varies constantly depending on factors such a limb intersections and offsets, ground-to-terminal arc heights, and lateral spacing in accommodation of existing stair tower geometry, exits and entrances. In practice, this design posed intense drafting challenges, as every modification to a member during the development stage resulted in a facade-wide recalculation of trunk and limb geometries. The work presented in this report was executed in AutoCAD 2010, employing essentially a digital version of hand drafting. A more appropriate process would have incorporated parametric design software where the established rules could be programmed in order to automate the geometrical calculations required.

NOTES

1.   An idea enunciated in conversation by professor Emanuel Jannasch, Dalhousie School of Architecture.

2.   Merlin James, *Engaging Images: 'Practical Criticism' and Visual Art* (London: The Menard Press, 1992), 28-9.

3.   Ibid., 10.

4.   Ibid., 78.

5.   Roger Mullin, "Drawing on the Visible, the Invisible and the Particular" (MArch thesis, Dalhousie University, 1998), 19.

6.   Robert Venturi, *Complexity and Contradiction in Architecture* (New York: The Museum of Modern Art, 1966), 13.

7.   Louise Pelletier, "Modelling the Void: Mathias Goeritz and the Architecture of Emotions," *Journal of Architectural Education* 62, no. 2 (2008), 11.

8.   Christopher Alexander, "A City is not a Tree," RUDI - Resource for Urban Design Information (1988),   http://www.rudi.net/books/200 (Part I), http://www.rudi.net/books/201 (Part II) (accessed 20 May 2010).

9.   Christopher Alexander, *The nature of order : an essay on the art of building and the nature of the universe* (Berkeley: Center for Environmental Structure, 2002), 9.

10.   Alexander, "A City is not a Tree."

11.   Marcel Mauss, *Sociologie et anthropologie* (Paris: Presses universitaires de France, 1966), 67.

12.   Ibid., 57.

13.   Sven Hesselgren, *The Language of Architecture* (Barking: Applied Science Publishers Limited, 1969), 31-33.

14.   Ben van Berkel and Caroline Bos, "Diagrams," in *This is Not Architecture*, ed. Kester Rattenbury (London: Routledge, 2002), 105.

15.   Halifax Regional Municipality, *Downtown Halifax Land Use By-Law. Schedule S-1. Design Manual* (Halifax: Government Publication, 2009), 23-25.

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Flickr. 1111 Lincoln Rd Parking Garage (photograph). http://www.flickr.com/photos/eager/5449759512/sizes/l/in/photostream/

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