

Horizons of Pattern Languages

Why architects should look much more carefully at the opportunities for a new generation of pattern technology

Michael Mehaffy

"[A Pattern Language] could very well be the most read architectural treatise of all time, yet in the architecture schools I know, it is as if this book did not exist."

- William Saunders, Editor, Harvard Design Magazine

Among architects, an appreciation of pattern language technology -- where it remains at all -- is largely confined to the book of 253 patterns by that name, written in 1977. A number of practitioners have written additional patterns (including this author) but they remain largely as supplements to the original primary collection. Aside from some recent work that originator Christopher Alexander himself has done, as yet there is nothing like a major new development of pattern languages. In spite of the book's perennial popularity, as William Saunders has noted, pattern language methods have had limited application in education and practice.

The state of affairs in architecture is in striking contrast to the software engineering world, where the same pattern language technology has had, it is fair to say, a ubiquitous and industry-wide impact. Even more telling may be the fact that most architects are ignorant of these developments.

I will argue here that this fact illuminates a major undeveloped opportunity for architects.

The prodigious success of software designers

Pattern Language technology was used as the foundation for a major pattern-based movement which has spawned an enormous corpus of work, centered around so-called "design patterns" - a highly influential class of object-oriented software programming methods. In turn design patterns were integral to the development of Wikis; simulation games like The Sims and Spore (and much other gaming technology); the Cocoa programming language on which all iPhone apps are created; Agile software development; Extreme Programming; and others.

Indeed, in taking stock of the development of pattern languages, an astonishing fact emerges. The activity in the realm of software dwarfs that of architecture – so much so that a simple Google search yields about 250,000 hits on "pattern language," but almost 5,000,000 hits on "design patterns" (only one of the software fields). This twenty-to-one ratio is telling.

Nor is the growth in pattern language technology confined to software. Within computer science it can also be found in information management, human-computer interface,

engineering protocol development and other related fields. Pattern language scholarly work can also be found in sociology, organization theory, economics, education, ecology, molecular biology and other fields. (This also means that the 250,000 Google hits cited above would be even smaller for architecture alone: it seems that more than half that number is accounted for by these other fields.)

Some of the most fascinating directions being explored come from “hard” sciences like molecular biology. In one notable example, Newman and Bhat of New York Medical College have proposed a “pattern language” model for the development and evolution of multi-cellular form, of the sort that occurred during the so-called “Cambrian Explosion” that gave rise to many modern animal forms. (Newman SA, Bhat R., Dynamical patterning modules: a "pattern language" for development and evolution of multicellular form. *Int J Dev Biol.* 2009;53(5-6):693-705.)

What are the lessons of what must be, for architects, a humbling comparison?

First, there is the possibility that the real usefulness of pattern languages simply does not apply to the field of architecture. But it would seem rather unlikely that a technology developed in one field is of so little use there, but of such enormous use in an unintended realm. It seems more likely that something has blocked the development of pattern languages in architecture to the same degree.

Along those lines, another possibility may be that many architects have mistaken *A Pattern Language* as solely a finite set of architectural prescriptions, and failed to grasp the potential of its deeper structural logic in the way that computer scientists did. This aversion may be especially emotional among architects, because any such finite set of prescriptions, however generative in nature, seems to place an unwarranted restriction on the designer’s unfettered capacity to create novelty. Such a line of thinking can be found in some of the most acerbic criticisms of pattern languages in architecture, such as those by Alexander’s Berkeley colleague Jean-Pierre Protzen, and Harvard Design magazine editor William Saunders.

Yet another possibility may be that architects – including Alexander himself, perhaps - have failed to adopt the collaborative, “open-source” methods of other disciplines. Whereas software designers immediately began sharing ideas about tinkering freely with pattern languages -- even exchanging them between highly competitive companies such as Tektronix, IBM and others -- architects have treated patterns as proprietary, and largely immutable. That is, either one applies the original 253 patterns, with perhaps a limited application of one or more additional patterns, or one abandons the technology altogether. But in no case does one “open the hood” and re-use the core system to develop all manner of new approaches, in the way that software designers have done with such evident zeal.

What is the core system?

To understand the power of pattern languages – and their potential for a renewed application to the field of architecture and urban design – we must remember the core structure, and the problem it was originally meant to solve. It has its roots in Alexander’s first major work, *Notes on the Synthesis of Form* (1964).

In *Notes*, Alexander defined the problem of architectural design (and by extension, any design) as, at heart, a problem of adaptation of a form to the structure of human needs. Traditional cultures, he argued, were able to create highly adapted forms through an effective piecemeal process over long periods of time. But in contemporary design, this slow adaptive process has been replaced by much more rapid, categorical methods of planning. These methods are often non-adaptive with respect to the real human problem to be solved, with the result that the designs often do not succeed in critical respects. From the Harvard University Press website summary of the book:

When the designer, in our own self-conscious culture, is called on to create a form that is adapted to its context he is unsuccessful, because the preconceived categories out of which he builds his picture of the problem do not correspond to the inherent components of the problem, and therefore lead only to the arbitrariness, willfulness, and lack of understanding which plague the design of modern buildings and modern cities.

In the second part of the book, Alexander proposes a method to overcome this shortcoming – a method

...by which the designer may bring his full creative imagination into play, and yet avoid the traps of irrelevant preconception. He shows that, whenever a problem is stated, it is possible to ignore existing concepts and to create new concepts, out of the structure of the problem itself, which do correspond correctly to what he calls the subsystems of the adaptive process. By treating each of these subsystems as a separate subproblem, the designer can translate the new concepts into form. The form, because of the process, will be well-adapted to its context, non-arbitrary, and correct.

The structure of these problems and subproblems was of particular interest. Their relation was not that of a simple hierarchy – what mathematicians refer to as a “tree” – but had characteristic overlapping patterns that gave it the characteristics of a network, or “semi-lattice.” While it was possible to partially “decompose” a given problem into a hierarchical structure, it was also important to recognize that the characteristic pattern of overlap was itself an important part of the system. This point was made in Alexander’s classic 1965 paper, “A city is not a tree:”

It must be emphasized, lest the orderly mind shrink in horror from anything that is not clearly articulated and categorized in tree form, that the idea of overlap, ambiguity, multiplicity of aspect and the semilattice are not less orderly than the rigid tree, but more so. They represent a thicker, tougher, more subtle and more complex view of structure.

How could one use these insights to structure a method of solving problems? This was the realization that Alexander made from his work on *Notes*, a realization that became the basis for the pattern language. As he explained in the introduction to the tenth year edition to *Notes*:

The idea of a diagram, or pattern, is very simple. It is an abstract pattern of physical relationships which resolve a small system of interacting and conflicting forces, and is independent of all other forces, and of all other possible diagrams. The idea that it is possible to create such abstract relationships one at a time, and to create designs which are whole by fusing these relationships--this amazingly simple idea is, for me, the most important discovery of the book.

So the structure of a pattern was very simple, and yet the results of this kind of fusing of relationships could be, no less than traditional built environments often were, highly complex. This theme of simplicity-generating-complexity is echoed in much of complexity science, where simple processes can generate, through adaptive iteration, the unfathomably complex (and often irreducible) structures of the natural world. (This is seen, for example, in the highly complex patterns of fractals as they are generated by computers, and in natural formations like clouds, sand dunes, etc.)

There is a corollary with languages, which have a limited set of words, and yet produce a vast set of complex meanings. The relationships between words are not mere linear ones (as, for example, in a mere list) but rather, they form a pattern of complex interrelationships (as, for example, in poetry). Again, while there are nested hierarchical relationships, there are also overlaps, cross-linkages, and ambiguities.

The structure of a pattern, then, is a straightforward one:

- Pattern title
- Iconic image: conveys the nature of the configuration, adding a qualitative dimension to the quantitative analysis
- Upward hyperlinks: connect the pattern to “upper” patterns that may contain it and others
- Problem-statement: gives the configuration of the problem
- Discussion: assesses of the associated issues to be treated
- Solution-statement: gives the configuration of the solution, together with any procedures to be followed
- Diagram: a cartoon of the solution, with simple notes
- Downward hyperlinks: connect the pattern to “lower” patterns that it may contain

The upward and downward hyperlinks establish any given pattern within a nested hierarchical structure. But crucially, once again, this structure is not rigidly hierarchical, but also allows overlap.

As the patterns are combined into a system, these overlapping relationships create the “thicker, tougher, more subtle and more complex” kind of structure that Alexander observed in natural cities.

Alexander’s critique of conventional practice – and its implications

Again, Alexander’s innovations were aimed, from the beginning of his career, at the chief failing that he saw in conventional practice: the inability to create successful adaptations

to the natural overlapping complexity of actual design problems. Yet as he argued in “A City is Not A Tree,” this is a perennial problem in modern planning, whose designs do exhibit this tree-like structure. This was because, he argued, the rational mind inevitably defaults to these neater, more easily managed categories of thought:

It is... because the mind's first function is to reduce the ambiguity and overlap in a confusing situation and because, to this end, it is endowed with a basic intolerance for ambiguity - that structures like the city, which do require overlapping sets within them, are nevertheless persistently conceived as trees.

But the result of this can be devastating:

...the city is not, cannot and must not be a tree. The city is a receptacle for life. If the receptacle severs the overlap of the strands of life within it, because it is a tree, it will be like a bowl full of razor blades on edge, ready to cut up whatever is entrusted to it. In such a receptacle life will be cut to pieces.

In this sense, pattern language technology was aimed very directly toward plugging a very real gap in modern design – one that amounted to a major technological shortcoming of modern methods.

It is not so surprising, then, that since Alexander was dealing with design as a broad topic, and not merely with architectural design, his solution did indeed have great relevance for other fields of design too – notably software design. These designers, too, needed to translate a very serial, hierarchical kind of process into a more usefully networked one. As Ward Cunningham documents in another paper in this collection, he and his colleague Kent Beck quickly realized that Alexander was onto something that they needed. It required extensive adaptation and customized structuring for their needs, but the gist of it was very much what their challenge required.

The Nature of Order

The popularity of *A Pattern Language* was certainly remarkable, and gratifying to Alexander and his colleagues – in particular its hoped-for success with non-architects seeking to design and build for themselves. (Its perennial bestseller status suggests it is still a major influence among this group.) But Alexander and his colleagues were disturbed to find that many of the designers inspired by the book produced crude work that lacked the simple dignity of older vernacular buildings. Clearly they had not succeeded in replacing the traditional pattern languages of vernacular building with an equivalent new technology. What was missing from the methodology?

Alexander came to believe that he had not sufficiently dealt with the detailed problem of geometrical form. Returning to the problem of the relation of parts to wholes, he asked, what is it about the particular geometries of the built environment that we find most satisfying – not just on the basis of one narrow problem-solving criterion or another, but more broadly, more on the level of a whole system? What characteristics do they have,

and what detailed processes actually created them, kin nature, and in traditional societies? And what can we learn from that to, once again, improve our own methods and results?

Answering this question, and documenting the ideas for his readers, was the task that would occupy him for the next 25 years, culminating in his magnum opus *The Nature of Order*, subtitled “An Essay on the Art of Building and the Nature of the Universe.”

Taking his cue from nature, Alexander studied the processes of morphogenesis in biology and other natural phenomena, and the characteristic geometries that resulted. Working phenomenologically rather than reductively, he grouped them into a series of categories, eventually distilling them down to 15 “properties”. They range from familiar ones like “boundaries” and “alternating repetition” to more esoteric-sounding ones like “not-separateness”. Even so, as always, the structural logic of even the esoteric-sounding ones is rigorous.

In addition to these geometric properties, Alexander also looked at the processes that shape them. He made an intriguing observation: each of the 15 properties has a corresponding kind of step-wise transformation that gives rise to it – and this goes for human acts of creation as well. These transformations do not create structure from scratch, but instead preserve some aspect of the previously existing structure. Hence Alexander referred to these as “structure-preserving transformations.”

The compounding of results through such a sequence of stepwise transformations turns out to have some surprising characteristics, as mathematicians like Stephen Wolfram have shown. What seems to be a straightforward linear process of steps turns out to produce, through the multiplication of pattern, astonishing complexity. One can think of the surprising results of just a few artful Origami folds, or the way two cooking ingredients can mix initially very crudely, but in just a few steps of kneading, can take on new properties. Compounding of the interrelationships creates some surprisingly transformative results.

This was a crucial finding. Our contemporary methods of technology have relied upon much more atomic processes of standardization, replication and combination. In architecture, they had their analogue in the technical act of “composition” – the assembly of parts to form pleasing wholes. This has been a powerful and productive strategy for humans in the modern era. But it is not the way that nature works to produce its bounty of successful, sustainable, beautiful structures. Rather, natural systems rely at least as much upon such stepwise processes of differentiation, transformation and articulation.

In natural processes, the whole characteristics of the system never arise anew from the mere aggregation of parts. Rather, there is a wholeness at some level that is always present, at every step. It is merely transforming as the steps go forward, and the structure unfolds, often into a more elaborate configuration.

In Book One of *The Nature of Order*, Alexander refers to famous photograph of the milk drop by Harold Edgerton. One can readily see that this very ordinary, quick, simple

process results in a remarkably elaborate structure with a deep interrelation of all the parts – a deep wholeness of the structure. Moreover, this is not occurring through only one logical step, but it is occurring continuously through a complex set of sequential transformations in time.

Note that it is never true that at any stage the parts “went together” in any conventional sense. Rather, the parts were differentiated out of the process, and changed their structure and their relationship to one another, as the whole went through each transformation. There was always a whole structure, at every step: the milk drop, and then the splattering form, then the deformed ring, then the articulated bumps, then the little arm-like appendages, then the emerging smaller spheres, then the cell-like regions at the bottom, and so on.

It now seems apparent that the process of morphogenesis in nature works very much like this, with structures responding to natural physical forces of this kind -- articulating, extruding, mirroring, and carrying out similar “structure-preserving transformations.” Nor are such processes strictly confined to biological systems: indeed, it appears that many other natural phenomena undergo similar processes.

A second, closely related point is that at any point, each region or center is in some way closely fitted to all the others, and to the whole. They are always in some sense part of a deeper order, and the act of creation is not to bring together an aggregation of atomic parts, but to orchestrate a transformation of parts that already existed within a whole.

Put differently, a local action can contribute most to the global structure when its already-existing, embedded relationship to that global structure is acknowledged and strengthened.

A Science of Qualities

For Alexander it followed that it is impossible to talk about the structure of a built environment and its effect upon the human user, without facing squarely the human users themselves, and the qualitative nature of their experience as an *a priori* condition that must be accommodated. One could pretend that qualitative experience didn't matter, and only quantitative analyses mattered. But it was increasingly clear that this omission was precisely the source of much of the current grief, and the reason that progress had begun to grind to a halt. It had continued in fields like neuroscience, artificial intelligence and other subjects of complexity, precisely because these fields had recognised the necessity of facing the phenomenon of subjectivity, and the subjective experience of value.

As Alexander noted, value is the unwelcome guest at the party, simply because it is so hard to define in quantitative terms. It is the ultimate holistic, emergent phenomenon. And yet, Alexander noted, value *is* a sharable phenomenon, and a discussable one. There are cognitive methodologies that can indeed reliably find large areas of shared value. Moreover, these shared areas turn out to have a definable relation to structure itself.

When it comes to living organisms, and apparently, when it comes to the built environment, value is rooted in the structure of things.

For many commentators, this is treacherous, alarming stuff – the makings of totalitarian design, or an enforced blandness of “average tastes”. But for Alexander, there is no alternative but to face it squarely. While some things are variable, not everything about value is entirely relative or “subjective”. Indeed, there seems to be something more like a continuum, from the personal to the universal. Our job as scientists is to tease this apart carefully, using rigorous scientific methods.

In this respect, Alexander sees no problem whatever applying the rigor of science to subjective and qualitative phenomena. Indeed, he sees them as necessary allies in confronting the current challenge of the built environment.

A biological perspective may help to put a more comprehensible perspective on the situation. Clearly there are matters of individual taste and preference in the built environment, but equally clearly, matters of shared valuation. (To illustrate the point with one extreme example, car exhaust is likely to be universally regarded as an undesirable feature of built environments, whereas, say, fresh air is generally regarded as desirable.)

There are structures within the built environment that affect human health and well-being, and for Alexander, it is the business of built environment professionals, not unlike doctors, to diagnose and prescribe more healthful and more desirable conditions. There is certainly art to it; but there is equally science, to be applied to the professional care of the well-being of others.

Correspondences with Other Fields

While some architects see Alexander’s work as idiosyncratic, many in other fields see familiar insights, and ready opportunities for collaborative development. As noted, there are strong correspondences with the insights of much complexity science, notably in the understanding of complex generative processes, adaptive algorithms, cellular automata and the like. There are resonances with biology, and the processes of morphogenesis. There are resonances with studies of wholeness in other disciplines, as for example in quantum physics. And there are echoes of the insights of neuroscience and the study of artificial life, in the study of qualitative phenomena and the surprising relation of living systems to non-living ones.

This author has certainly found that many notable practitioners in other fields have taken note of Alexander’s work, and are in fact eager to compare notes and collaborate. Based on this insight, we have established a consortium we have dubbed the “Environmental Structure Research Group.” (See www.aboutus.org?ESRG) It includes members such as Wiki inventor (and design pattern pioneer) Ward Cunningham, who participated in the symposium on which this book is based. It also includes prominent biologists, ecologists,

cognitive psychologists, economists, sociologists, political scientists, physicists, mathematicians, physicians, philosophers, and others.

As Wiki inventor Ward Cunningham has noted, many of the problems Alexander has explored are indeed inter-disciplinary in nature. (Hence the interest of him and other computer scientists in this work.) For example, the topic of generativity is a very important one in computer programming, and Alexander has explored it very directly, and in a way that Cunningham and others have clearly found useful.

Yet this and other topics are evidently not of much interest to many architects, except perhaps as devices to generate expressive ideas. This may be, again, because the emphasis in architectural design is on the expressive qualities of the work, as opposed to its adaptive problem-solving power.

Alexander's work also shares strong correspondences with other reformers in the planning and urban design fields. For example, the pioneering urban scholar Jane Jacobs wrote extensively about the topic of "organized complexity" and the importance of its insights for the design of cities. She also spoke of the generative capacity of cities, and the responsibility of designers to facilitate this capacity. She warned about the practice of composing from scratch, and argued that the best cities continuously generated their qualities of life from their existing ingredients, however humble.

More recently, leaders of the New Urbanism movement have campaigned for greater mixed use and diversity in development, and more use of existing patterns. Founders like Andres Duany have acknowledged their debt to both Jacobs and Alexander. Duany is now working on a reform-minded zoning code, and has asked for collaborative help with Alexander's associates including this author, through the work of the ESRG. His so-called "SmartCode" was recently adopted by the City of Miami, as well as the City of San Antonio and other US jurisdictions. It is now under consideration as a principal planning tool for the government of Scotland.

All of these collaborators have shown a willingness to work in an "open-source" format with Alexander and other colleagues, and to find new insights that will benefit architecture as well as other fields. At the same time, many of those from other disciplines have also expressed some bemused perplexity at the apparent isolation of architects, and at Alexander's "prophet without honor" status in his own ranks.

Operationalizing the Insights

The Nature of Order was a treatise, not a manual of applied technology in the style of *A Pattern Language*. While it gave a number of methods for design using its insights, it left a number of topics for further development. Among these we might include:

1. **Generative codes.** How does one operationalize “structure-preserving transformations?” What are the steps that one can take to incorporate qualitative and diagnostic procedures within a stepwise methodology of this kind?
2. **“Massive process difficulties.”** Alexander notes that there are major constraints on the kinds of processes he describes, built into the current institutional system of design and building, and into the current flow of money and debt. As he notes, these need much more work.
3. **Collaborative development.** What can we learn from the success of those in the software community for greater progress? How can we incorporate more “open-source” methods into the work ahead? Given that Alexander has been at work for over a half-century, how will this work be taken forward?
4. **The remaining opportunities with pattern languages.** As we have seen, the software community has also achieved much more success with pattern languages as a robust technology. What can we learn from them? What can we learn from Alexander’s own later work, which was meant to address the perceived weaknesses of pattern languages? What opportunities remain to return to pattern languages, and infuse them with useful new capabilities in architecture?

Conclusion – The Horizons of Pattern Languages

This, then, is the work before us now. I suggest to you that the conclusion of this discussion is that there is indeed something missing from modern technology, something that has begun to be found in fields like software development, open-source technology and other fields. It is a set of methods that allow us to work on non-linear and whole systems, and to achieve a much better adaptive fit in our designs - not only as expressive compositions, but as transformative parts of the built environment, embodying both art and science.

In particular, the technology of pattern languages is ripe for the development of more generative and geometrical components. Alexander has experimented with generative sequences or “unfoldings,” that could in principle be inserted into pattern languages as, in effect, generative subroutines. Alexander has also sought to deal more with geometrical characteristics in his most recent work with patterns, and even with types and archetypes. Our colleague Kyriakos Pontikis (also an attendee at the conference, and an ESRG colleague) has experimented with generative geometrical characteristics in pattern languages, working with his class at California State University Northridge. Other ESRG colleagues developing innovations in this area include Yodan Rofe’, Stephen Marshall and David Miet.

We think there are exciting frontiers remaining. If we can get just a fraction of the remarkable success of software designers using the same technology, we will have made an enormous advance.

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APPENDICES: Sample Patterns



ATTACHED BUILDINGS

[Upward hyperlinks: Buildings with [Zero Lot Line Construction](#) will need to establish protocols for the design and constructing of their attached buildings, which are given here. A lot line may be modified by the pattern [Street Mutation](#), and then the owners will wish to develop Attached Buildings, given here. ...etc]

Problem-statement: As the plots in a block are built out, there is often a need to create attached buildings incrementally. But this requires that many problems be solved. These include fire protection, water intrusion, and protection of each side in the event the other is modified or demolished.



Discussion: Let us suppose that two adjacent plot owners have agreed that they would prefer to build attached buildings, but their plans are not necessarily standardized. One unit may be taller than another, or wider than another. Furthermore, one party may make changes later that will expose parts of the other's wall. In each case, care must be taken to protect the separate buildings from damage by water, fire and other dangers.

This requires that a number of steps be taken to protect each side.

- First, each wall must be built as a fully insulated, weather-protected enclosure, of a type that allows flashing to be installed (see below).
- Second, flashing must be introduced at the top edge where the two buildings abut.
- Third, an air space of approx. 1" must be maintained between the two walls. This gap can be enclosed by a method agreed upon by the parties and the building official, such as caulking with a backer rod at the exposed edges, or covering with a piece of trim.

- Fourth, any elements of one structure that project beyond the surface of another must be built with fire-resistive structure, as required by local building codes.

Therefore:

Where attached buildings are desired, build each building as a free-standing structure, with full sound insulation, moisture protection, and all other engineering requirements. Make sure that the party wall is set up to admit flashing for an adjoining construction, and to maintain a minimum 1-inch air space (i.e. 1/2 inch to the property line on each side). When both structures are complete, the remaining exposed areas and gaps can receive an exterior finish that is agreed by both parties.

Maintain an agreement between the neighbors that specifies how many times modifications may be made, and the relative responsibilities of each for incurred costs. Record this agreement with your local property deed authority.



[Downward hyperlinks: A portion of a residential yard may need to accommodate a side yard, given in the pattern [Side Yard House](#). Etc...]



STREET MUTATION

[Upward hyperlinks: TBD]

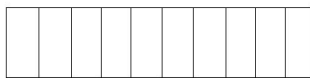
Problem-statement: Perfectly aligned streets of standard widths can be rigid and lifeless. But incremental variations to street alignment and width can result in unforeseen problems.



Discussion: One model of development is for streets to be laid out in perfect alignment, with plots neatly facing them. But there are many other possible forms of street and plot relationship, as history has shown – and many of the most successful grew (or changed) incrementally, without being planned in advance as they ended up. How can we incorporate such a process today?



TRACT



"DUMMY LOTS"



FINAL AFTER L.L. ADJUSTMENTS

One problem is procedural. How can such a process occur within the standard platting process that exists in many locations? We have found a relatively simple mechanism, which addresses both street mutations and other sequential adaptations. It creates a series of “dummy lots” within a standard platting process (see example at left) and then allows owners to make sequential modifications to them, using a simple process known as “lot line adjustment.” The most difficult part of the process is the treatment of the right-of-way, which is typically “dedicated” to the City or other jurisdiction within the platting process. Again, this can be done as a standard or “dummy” tract, and then adjusted through the lot line process.

This requires that the City or other street authority establish very minimum standards for street width, curb design, sidewalk and streetscape elements, and so on. (These can also be expressed as patterns.) In a low-speed, relatively low-volume condition, such standards can be very loose. (See e.g. the work of Hans Monderman and other researchers in the field of so-called “shared space” design.)

Once the standards are established, then the owners are allowed to make their street mutations as they choose, within the minimum standards. The local authority over the streets will review and approve the plans, or else advise of changes needed.

The only other element that is essential is that each successive owner must connect to the end-points established by the previous owner, and do so without exceeding the geometric standards specified by the local authority. The owners may wish to work together to create a shared pattern such as a front courtyard, garden or parking area.

Therefore:

Where street mutations are desired within a local development area, create a standard or “dummy” street tract, and then specify a nominal, minimum and maximum width. Then each successive owner may establish their own frontage property line, following the simple rule: connect to the previous adjacent owner’s frontage property line, stay within the minimum and maximum widths, use the established curb pattern(s) for that area, and integrate other approved design elements into the streetscape.



[Downward hyperlinks: If adjoining owners wish, they can create [Attached Buildings](#). They can also make agreements to share features, such as [Front Garden](#), [Entrance Square](#), [Shared Parking](#), [Close...etc](#)]



SIDE YARD ACTIVATION

[Upward hyperlinks: Owners who wish to build [Zero Lot Line Construction](#) may have difficulty coordinating the ingredients of a side yard condition -- especially when windows are desired -- and this coordination is given in this pattern. ...etc]

Problem-statement: The side yard is a highly efficient urban type that takes maximum advantage of otherwise wasted space, and offers an excellent indoor-outdoor relation. But incremental development of lots can create unforeseen problems.



Discussion: The side yard allows activation of what may otherwise be a dark, useless setback area between buildings. Essentially, one building pulls back, in whole or in part, far enough to create at least a 3m (10') strip of yard. (For optimum solar exposure, this is ideally the building to the north or west in most Northern Hemisphere climates, and the one to the south or west in the Southern Hemisphere.)

Such a side yard can allow a very strong indoor-outdoor relationship. Where the yard faces the front, it can also create a strong semi-private relationship to the street and public realm. (In some patterns this side yard becomes a beautiful entrance patio.) Where the rear area is on an alley, there may not be space for a rear yard, and a side yard may be the only option, or a welcome supplement to a very small rear yard, creating a greater sense of outdoor space in an otherwise intense urban environment.

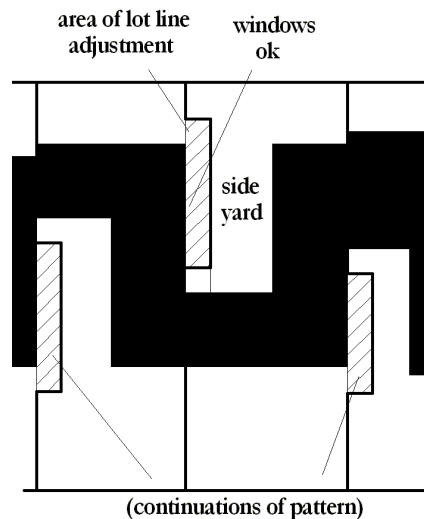
However, when development is incremental, a number of things can go wrong. The adjoining building may have windows facing directly into this private area. Or the adjoining building may have a tall wall and/or broad eaves, which block out sun and create an undesirably dark space (in all but the hottest and sunniest climates). If the adjoining building is set back from its property line to allow for windows -- as many fire codes require -- there may be a useless strip of setback yard with a fence, making it all the more difficult to maximize outdoor space.

A series of rules agreed to by the owners can avoid these problems. A standard reciprocal agreement can allow the yard to be maximized in width while the abutting owner is allowed to have windows that manage privacy, and assured the right of access for maintenance. In turn, that owner might enter into the same agreement with the next owner, allowing the benefits to extend down the line of properties.

In practice this means that the property line is adjusted for the building abutting the side yard, to comply with fire codes for window placement. A reciprocal easement is created over the yard, to allow the abutting owner to access their building for maintenance, and to allow the owner of the side yard to use the other owner's strip as part of their yards, subject to restrictions (e.g. items that might restrict maintenance access, or damage the adjoining building).

Therefore:

Whenever an owner of a lot wishes to construct a side yard, and the adjacent owner wishes to have windows in that area, create a lot line adjustment that allows a tract of land sufficient for windows to meet fire codes. Create a reciprocal easement on this tract, and on the yard, such that both owners have access as needed for maintenance. Create an agreement specifying restrictions on use of the yard sufficient to provide maintenance access, and specifying placement of windows, walls and eaves to ensure privacy and good light.





[Downward hyperlinks: TBD]