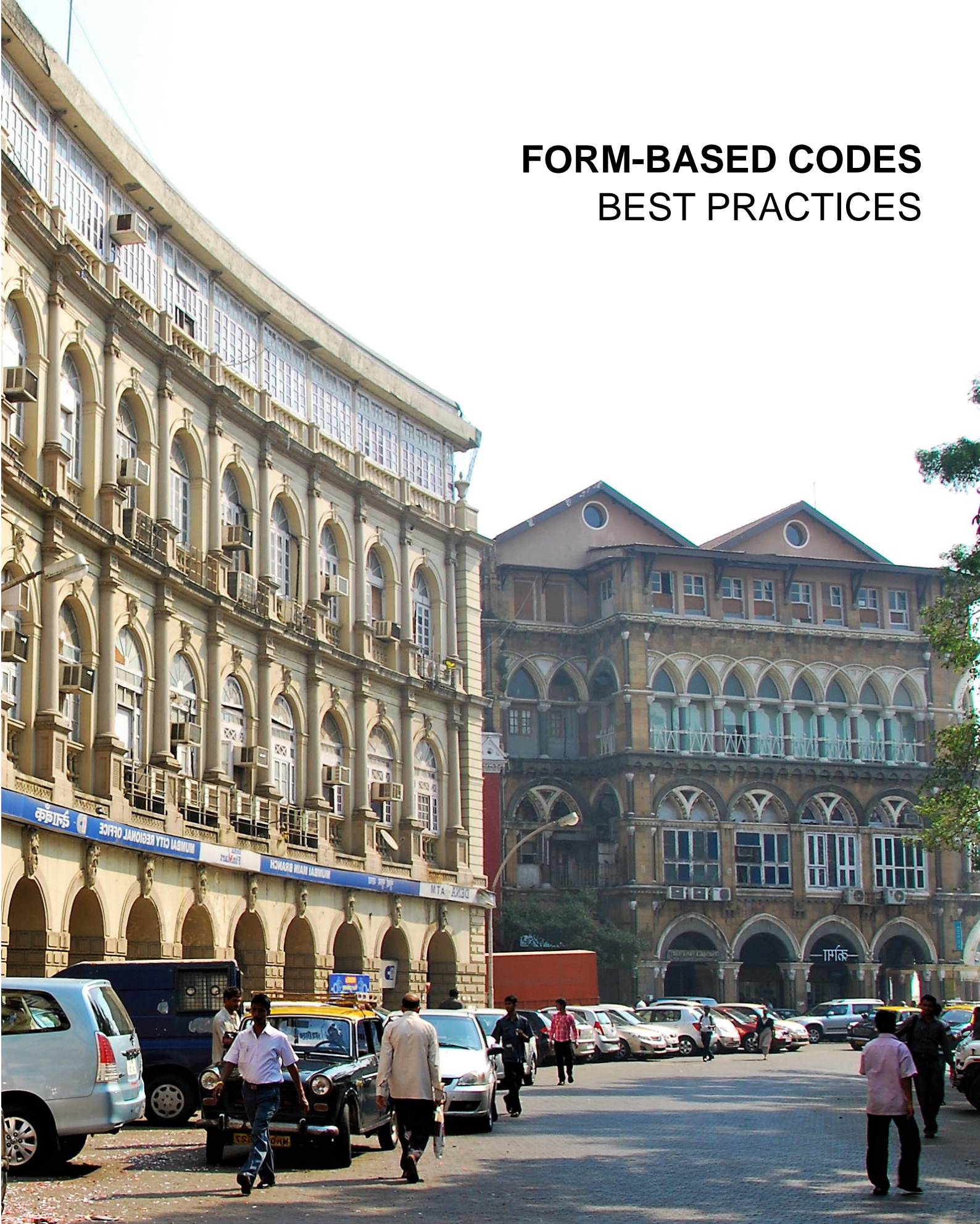


FORM-BASED CODES BEST PRACTICES





Ministry of Housing and Urban Affairs
Government of India

ABOUT MINISTRY OF HOUSING AND URBAN AFFAIRS (MoHUA)

The Ministry of Housing and Urban Affairs is the apex authority of Government of India to formulate policies, coordinate the activities of various Central Ministries, State Governments and other nodal authorities and monitor programmes related to issues of housing and urban affairs in the country. The Smart Cities Mission was launched by the Ministry in 2015 to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.



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Case Study 1: Santa Ana Downtown Renaissance Specific Plan. Santa Ana, California

1.0 Background

Santa Ana, with a population of approximately 340000 people, is the most populated city in Orange County. The city wanted to undertake the regeneration of a 457-acre area of its core, which represented three districts and their neighborhoods. These areas were deteriorating due to application of renewal and traffic engineering solutions that primarily aimed to facilitate to and fro access and did not consider the community needs. The FBC exercise there was then undertaken to preserve the historic character of the area under consideration.

Structure of the code

- All the Form-based codes were created for the selected area, replacing existing guidelines. The FBC was created to implement the neighborhood, district and corridor vision for the project area which was derived through a public outreach process.

Table No.1: Snapshot of Santa Ana downtown renaissance specific plan

Scale	Part of the city/Town (457 acre/135 blocks)
Implementation method	Specific Plan
Site Context	Redevelopment/ Infill
Site Size	457 acres/ 135 blocks
Administration	City/County Staff
Organizing principle	Transect
Agency	City of Santa Ana Planning and Building agency.

2.0 Organizing principle

The code adopted transect zones, primarily because of ease of understanding and the use of building types and street types as the organizing principle for regulating infill development.

3.0 Planning Context

To ensure appropriate character of development, the code included the following:

- Precise allocation of zones to existing conditions:
This provision ensured that the area when allocated with the zones served a purpose as ascertained by the community as part of the visioning exercise.
- Regulating building size and massing:
This was done to allocate a percentage of a building's footprint for upper stories and eliminated the risk of single height buildings. It also allowed more flexibility for the owner/ designer as compared to abstract FAR requirements and ensured variety among the builders due to individual choices.

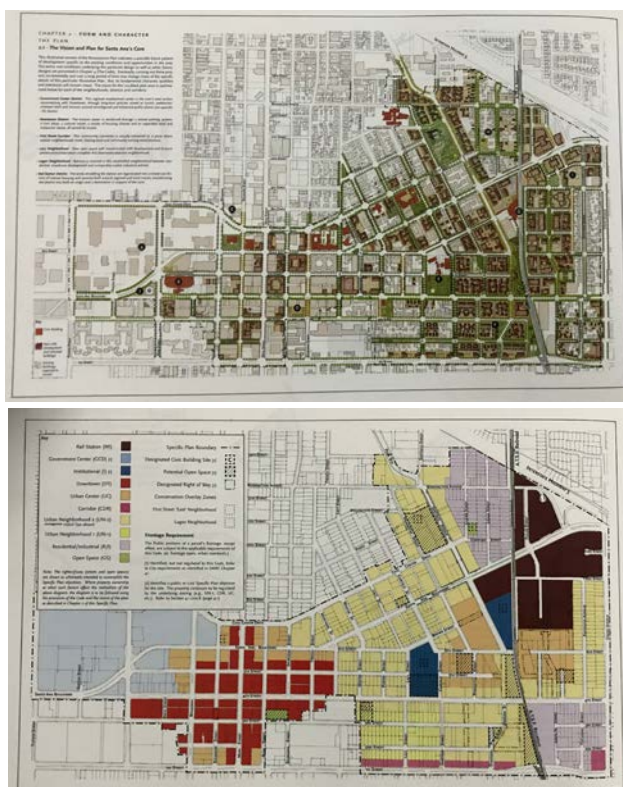
4.0 FBC Approach

4.1 Review, Access, Plan and Design

- The coding process was oriented around public outreach where the community established issues and expectations for the revitalization framework.
- The public outreach process was supported by extensive analysis of existing conditions including the fiscal information in a diagnostic way which was easy for the participants to understand.
- The code that was developed consisted of building type standards, regulation plans, frontage types and open space standards.

- The building types regulation in this code defined 12 types of building namely, tower-on-podium, linear, hybrid courtyard, commercial block, stacked dwelling, courtyard housing, industrial shed, live/work, row house, duplex/triplex/quadplex and single dwelling units. These also included minimum lot width, access, parking, service, open spaces, landscape, frontage, building size and massing. These were one of the most elaborate building types standards.
- The regulating plan was expressed through two diagrams- existing right-of-way (ROW) and future ROW. This also included all the historic preservation details through conservation overlays which had specific requirements for historic structures.
- The frontage types standards elaborated on individual components along with appropriate numerical and proportional standards.
- All the open spaces types were identified on the regulating plan and supported through measurable standards along with the siting requirements.

Figure 1 | An Illustrative Plan (above) and regulating plan (below) for Santa Ana downtown renaissance specific plan



4.2 Public Participation

The public process involved a three-pronged approach:

- **Precharrette:** Using analysis of the existing conditions and interviews of each city department, the appointed consultant team facilitated four discovery workshops with the community to establish the issues to be addressed. The established issues were then shared with all the concerned departments for feedback and reactions which were again shared with the community to cement the issues and challenges.
- **Charrette phase:** A seven-day charrette was organized to prepare all the project diagrams, projections and details for the specific plan including complete FBC. All the stakeholders were involved for a full seven days to create the desired plan.
- **Post charrette phase:** After incorporating certain refinements, the Charrette results were communicated to the participants for their feedback and reaction. The same was received, incorporated and again discussed with the workshop participants. This enabled the formulation of a specific plan.

Figure 2 | Showing Renovated mid-1920s building with housing above ground-floor retail



Figure 3 | **Showing Residential tower at Rail Station District**



5.0 Administration

The code is administered by the Planning and Building agency. In addition, the public works department administers the street standards in the code.

6.0 Learnings

- The code was developed for redevelopment/Infill projects.
- It was developed for regeneration of a historic area by formulating and adopting alternative codes instead of conventional codes.
- The code focused on a designated area and further divided it into four communities for better inputs.
- The city of Santa Ana planning and building agency was the anchor agency for implementing the codes. However, the Public works agency was responsible for administering the streets standards in the code.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation and discussion were the core for development of the code and project details.
- Also, the involved stakeholder eventually wanted to work more with the public works departments to improve traffic engineering practices related to curb radii, on-street and off-street parking.

Case Study 2: Downtown Master Plan and Form-Based Code. Benicia, California

1.0 Background

The city of Benicia has a population of approximately 28,000 people and is located along the Carquinez Strait in the San Francisco Bay Area. The general plan update process introduced a vaguely defined mixed-use land-use category. The mixed-use land-use category was applied to the city's main streets and surrounding neighborhoods.

The city then hired consultants to refine the definition of mixed-use land-use within the downtown neighborhoods through a publicly driven master plan process and replace the zoning with a Form-based code that would implement the vision plan and make zoning consistent with the general plan.

Structure of the code

- The primary goal of this process was to implement the vision plan, which was preservation-oriented in nature, and create form-based codes, a regulating plan and build-form standards to replace the existing zoning.
- The architectural standards of the downtown historic resource plan, completed prior to the FBC process, were kept.
- The existing street standards were reviewed and found to be in line with the Master Plan. It was observed that these were functioning well and needed no revisions.

2.0 Organizing principle

The code adopted transects as the organizing principle as they were an effective tool in educating the community about the appropriate levels of urbanism within their borders and how transect-based regulations could reinforce these patterns.

Table No.2: Benicia downtown master plan and FBC

Scale	Mandatory and Integrated
Implementation method	Redevelopment/ Infill and Greyfield
Site Context	
Site Size	City/ County staff
Administration	City/County Staff
Organizing principle	Transect
Agency	City of Benicia, California community development department

3.0 Planning Context

To ensure appropriate character of development, the code included the following:

- Regulations to support the artistic community: This section was introduced to ensure support to the strong artist community that lived in Benicia. While introducing the mixed-use, care was taken on how the artist studios and galleries were accommodated to support this way of life. In addition, the allowance of live/ work, shop front building types in the town center were done with an artist's lifestyle in mind.
- Reintroducing galleries to main streets: The downtown historically had wooden galleries over the sidewalks which were worn down. The Master Plan reintroduced the galleries along the main streets, and the FBC allowed reinstating the characteristic in future new buildings.

Figure 4 | **Downtown Benicia illustrative Framework Plan**



Figure 5 | **Downtown Benicia Regulating Plan**



4.0 FBC Approach

4.1 Review, Access, Plan and Design

- A documentation process at the macro and micro scale initiated the process.
- At the macro scale, existing neighborhoods, districts and corridors were documented in the form of a diagram to understand the role of downtown, and streets that passed through and next to the planning area.
- The micro scale details like lot sizes, set backs and heights were gathered in the form of a matrix that later evolved into the building standards.
- One of the primary roles of the FBC process was to preserve the historic character of the downtown. It required that any new building that was developed reinforced the character of the neighborhood.

- The code was a simple application model for a small-town downtown which could be taken up by other towns who were in the process of making their downtowns and surrounding neighborhoods more vibrant while preserving their historic character.
- The code adopted the transect through the creation of Subzones that defined the unique character of each. The zones were:
 - Town Core (TC) which primarily enhanced the vibrant, pedestrian oriented character.
 - Town Core-Open (TC-O) that primarily regulated the physical form of shop front buildings along the side streets.
 - Neighborhood Center (NC) that primarily reinforced and enhanced the pedestrian oriented character of locally serving retail and commercial use along existing commercial centers.

- Neighborhood General (NG) that primarily protected the integrity and quality of the downtown residential area.
- Neighborhood General – Open (NG-O) which primarily focused on the coherence of a residential building's character to its adjacent residential building.

4.2 Public Participation

- After the documentation process was complete. A five-day public charrette was launched to engage the local community members and stakeholders to help them establish their vision for the downtown.
- During the charrette a draft of form-based codes was developed and was discussed with the participants, along with a template draft of building form standards.
- After approximately six to eight weeks the form-based codes were completely drafted and were approved by the city council within four months of the charrette.
- Overall, there were three formal public presentations and several breakout sessions with the participants. The entire charrette process was conducted as per the National Charrette Institute's (NCI) dynamic charrette process.

5.0 Administration

The code was administered by the city staff.

6.0 Learnings

- The code was developed to solidify the definition of mixed-use land-use for the downtown area with a view to preserve its historic character.
- The code focused on neighborhood level implementation.
- The city staff was the anchor agency for the code formulations, adoption and implementation.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation was an integral part of the process at various stages.

Case Study 3: Miami 21, Smart Code

1.0 Background

Miami adopted form-based codes as a means of making the city more sustainable and preserving the character of the neighborhoods while allowing growth and evolution. Initially the city decided to start by applying the code change on corridors only but by the time the quarter-mile radius was added to the plan, almost the entire city was covered. The city then decided to divide the city into four quadrants that would be coded individually.

The biggest challenge for the city was to strike balance between the part of the city that were dense or were regulated to become dense and the single-family neighborhoods, while looking at establishing the nodal growth pattern along established corridors.

An approach of developing a comprehensive plan was adopted with the purpose of addressing variations that the city offered. The Miami codes established the following:

- Building form Standards
- Public space standards
- Architectural standards
- Frontage Standards
- General Landscape standards

The code chose not to regulate building types directly as the purpose was to regulate the private realm up to the point where it would produce a good public realm.

Structure of the code

Each section of the Miami 21 Code was called an article and the overall code was organized under eight articles as below. It established standards and procedures for new development or redevelopment in the City.

- **Article 1:** Definitions of Terms and Uses defined key terms in the Code in three sections: definitions of building function use, definitions of terms and definitions of signs.

- **Article 2:** General Provisions contained information on the legal framework of the Code, including its intent and purpose and the Miami 21 Transect principles for settlement patterns that guide the Code.
- **Article 3:** General to all Zones introduced the Transect Zones as the structure for requirements related to Density and Intensity, provided guidance for phasing, Lots and Frontages, Density Calculations, Height, off-street Parking and Loading, Sustainability, public Thoroughfares and Frontages, Special Area Plans, Historic Preservation, Waterfront Standards and the Public Benefits Program.
- **Article 4:** Standards Tables illustrated the components of the Code such as Intensity and parking requirements per Transect Zone.
- **Article 5:** Specific to Zones established the Transect Zones and the regulations that apply within each Transect Zone. Uses and development standards for each Transect were specified
- **Article 6:** Supplemental Regulations set forth regulations that apply to specific uses in addition to the general regulations and transect regulations set forth in other Articles.
- **Article 7:** Procedures and Nonconformities set out the rules for applying the Code and addressing conflicts.
- **Article 8:** Thoroughfares set forth guidelines and definitions for public thoroughfares, as well as a catalogue of thoroughfares appropriate to various Transect Zones.

2.0 Organizing principle

The Miami 21 smart code adopted transects as the organizing principle for addressing the complexity of physical size and use needed in the city.

Table No.3: Miami 21 Smart Code

Scale	Part of the city/ Town (Quadrant)
Implementation method	Mandatory and integrated
Site Context	Redevelopment/ Infill Greyfield
Site Size	
Administration	City/County Staff
Organizing principle	Transect (Smart Code)
Agency	Transect City of Miami

3.0 Planning Context

The Miami code included the following to ensure that the development was contextual.

- **Abutting T-Zone transitions:** This section addressed the issue of transition from more intense zones to primarily single-family zones through building form standards.
- **Floor Plate Maximums:** This section addressed the floor plate permissibility for infill residential and commercial developments. The building form standards established maximum floor plate sizes. For example, in one of the sub zones the maximum floor plate size for residential and lodging buildings was 15,000 Sq.ft. and for office and commercial buildings it was 30,000 Sq.ft.
- **Regulation by Net Lot area and Gross floor area versus Gross lot area and Net Floor area:** This section was introduced to regulate the calculation of FAR for various developments within the city.
- **Trees required in front yard:** This section elaborated on the minimum requirement for trees in the front yard of any building w.r.t. reduced solar heat gain.
- **Parking requirement reduced near TOD:** This section was created to incentivize development around transit by reducing parking requirements. It was suggested that the parking requirements for all the zones could be reduced to 30 percent for lots within a half mile radius of Transit Oriented Development (TOD).

4.0 FBC Approach

4.1 Review and Access

- Complete analysis of uses primarily to remove redundancy
- Thorough analysis of existing codes
- Neighborhood, district and corridor analysis
- Synoptic survey of different existing zones
- Analysis of Development capacities as per existing codes and proposed codes

4.2 Plan and Design

- Determination of how existing zones translated into T-Zones which were further divided in to Sub T-zones.
- Studies on how the corridor would evolve appropriately in size and transition into single family neighborhoods
- Building form standards draft.
- To encourage development of the green buildings, addition Square feet was allowed for buildings certified by the US Green Building Council as below:
 - Silver: for buildings under 50,000 Square feet, 2.0 percent of the floor lot ratio (FIR)
 - Gold: 6.0 percent of FLR
 - Platinum: 14.0 percent of the FLR

Figure 6 | Showing FBC Design intervention in one of the Sub-transect zone



4.3 Public participation:

Miami 21 FBC undertook an extensive formal public participation approach, over a period of plan development, in the form of open houses, workshops, public presentations etc. In addition, throughout the evolution of the plan, city officials constantly interacted with stakeholders like property owners, architects, attorneys etc. to address the issues of the code.

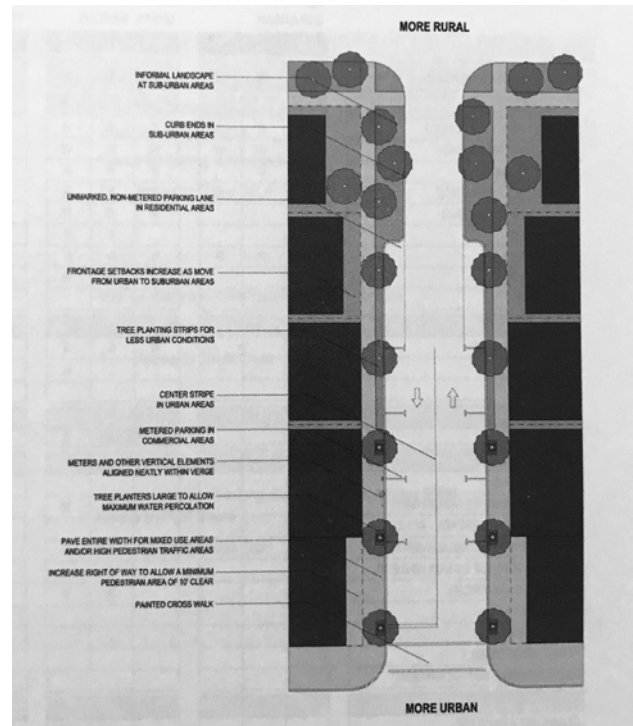
5.0 Administration

The code was approved by the planning advisory board before it was submitted to the city commission which was the final authority for code approval. The code was administered by the city planning authority. The Planning agency was most involved in the development and evolution of the code.

6.0 Learnings

- The city planning authority was the anchor agency for the undertaking the development and evolution of the code. They were also responsible for engaging all other relevant stakeholders.
- The development code ensured that contextual requirements were included and emphasized within the code. It offered elaborate urban design development code.
- Public participation was an integral part of the process at various stages. Hence, public participation and involvement becomes important.
- The focus was to develop a quality public realm.
- This code gave the application at area level.
- Although the code was considered a successful FBC intervention, it was observed that all the agencies were not as equally integrated into the process and were not informed of the intent. Hence, it was felt that an overview course on the smart code would have been beneficial for all concerned agencies involved in the final refinements and approvals.

Figure 7 | Through access across the transect



Case Study 4: Development Code update and Form- Based Code, Grass Valley California

1.0 Background

The city of Grass Valley has a population of approximately 12,000 people and is in Nevada County in Northern California. It is the largest city in the western region of Nevada county.

There was a need for a comprehensive update of zoning ordinance as the existing standards encouraged more suburban built environment rather than the compact, diverse style development that had historically occurred in the community. Besides, the city’s 2020 general plan also envisioned compact, diverse style development. To achieve the goals and objectives of the general plan, it was decided to follow form over function to implement the general plan’s policy and preserve the unique character of the community.

Structure of the code

- The primary goal of this process was to integrate a form-based codes approach into the conventional development code framework which was due for an update. The form-based codes were applied to selected areas or sample areas which included historic downtown, two historic neighborhoods adjacent to the downtown and a strip of commercial corridor in need of improvement.
- One of the selected neighborhoods primarily needed the FBC to preserve and enhance its existing character and the other one needed to regulate the transformation of the neighborhood from single-family to a medium density neighborhood and the corridor needed the FBC to guide the evolution of single-use auto oriented corridor into a mixed use and walkable neighborhood.
- The FBC framework was formulated as a methodology which could be applied to the entire city once the sample areas showed successful results.

- The code provided for adapting the transect zone through sub zones. These subzones were created as part of general neighborhood zones namely NG-1 , NG-2 and NG-3. Each sub zone represented primarily residential areas with different levels of allowed intensity of development with NG-1 being the lowest and NG-3 being the highest. Besides a neighborhood center zone (T4) was created to reinforce the existing mixed-use neighborhood centers.

2.0 Organizing principle

The code adopted Transects as the organizing principle as they were an effective tool in educating the community about the appropriate levels of urbanism within their borders and how transect-based regulations could reinforce these patterns

Table No. 4: Grass Valley Development code and FBC update

Scale	Part of a city/town
Implementation method	Mandatory and Integrated
Site Context	Greenfield Redevelopment/ Infill Greyfield
Site Size	
Administration	City/County Staff
Organizing principle	Transect
Agency	City of Grass valley community development department.

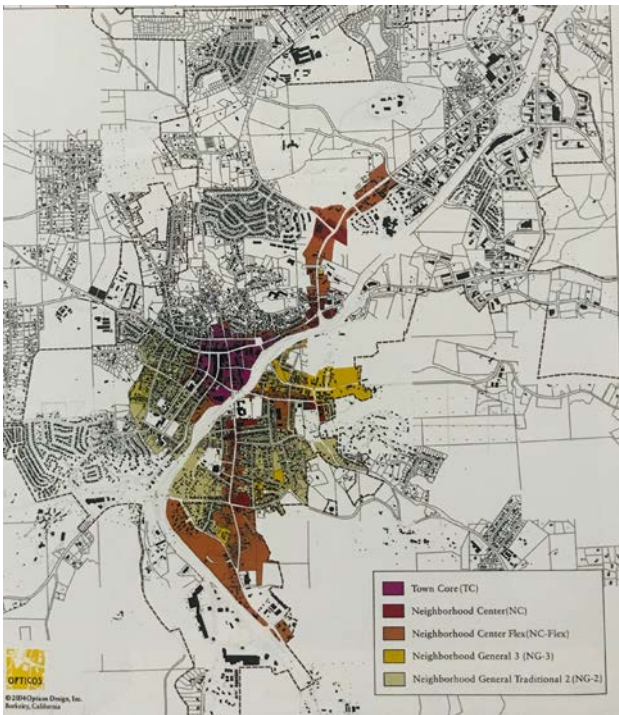
3.0 Planning Context

To ensure appropriate character of development the code included the following:

- Modifying Build-to-lines or sites with topographic constraints: This section was introduced to modify the build-to-lines (BTLs) to respond to the context. Also, with the FBC the galleries could encroach over public ROW’s in mixed-use areas.

- Encouraging appropriate infill at neighborhood centers: This section was included with an intent to reinforce the existing framework of mixed-use, commercial, neighborhood centers. The code presented no-parking for uses under 3000 Sq.ft. within the neighborhood center.
- Removing single-use commercial district that was eroding a neighborhood: The process and FBC code removed single -use professional office space from neighborhood centers and introduced a zone named as NC-flex zone which allowed for well-designed residential and commercial infill.

Figure 8 | Grass Valley Form-Based Code Regulating Plan



4.0 FBC Approach

4.1 Review, Access, Plan and Design

- The General plan that was in place was not created with the foresight of laying a framework of FBC. By the time the FBC process was taken up, the city was already preparing the streets Master Plan and in addition, the

architectural design guidelines were already in place for the historic downtown. All these documents were reviewed and incorporated in the development code update that was underway to accommodate the FBC process.

- For the FBC process, documentation and analysis phase was the starting point as it was completely missing in the general plan process.
- The documentation was done at macro scale and then transitioned to the micro scale.
- At the macro scale, existing neighborhoods, districts and corridors were documented in the form of a diagram. Then the general plan objectives and planning studies were used to add new neighborhoods, districts and corridors while designated the elements that should be regulated to evolve or transform.
- As part of the macro scale all the characteristics of each sampling area were documented to form base for the building form standards and the subdivision ordinance.
- Post the documentation, the areas for form-based codes application were decided and draft development codes including the FBC codes were created for each one of them.

4.2 Public Participation

- One of the primary objectives of the development code update was to implement the objective of general plan. Much of the necessary public outreach had already been done during the prior process.
- The advisory committee consisting of two city council members, one planning commission member and four community representatives including one from a local builder's association and a representative of the downtown association ensured that the code update reinforced the comprehensive plan vision.
- The entire process took about three and half years. This time allowed the officials to build capacities on how FBC would work in coordination with the rest of the development code.

- Further two stakeholder consultations were held with property owners and the public. This entire process enabled the members to take ownership of the document and help in getting it through the planning commission and city council approval process.

5.0 Administration

The city was administering the Form-Based Code.

6.0 Learnings

- The code was developed as a model that could be scaled up to the entire city.
- The primary intent of the code was to plug in the Form-based code within the conventional zoning code and produce a hybrid code.
- The code focused on selective neighborhood/ area level implementation.
- In the process it was observed that the existing general plan posed a hindrance to provide more flexibility to the Form-Based code as the city wanted to avoid the general plan update. Also, the streets master plan ultimately progressed on its own tangent with less coherence with the FBC approach which resulted in street standards that were not pedestrian oriented in nature.
- It was believed by the involved stakeholders that if the codes were to be redone then four things would have been approached differently, namely interface with the street master plans could have been better coordinated, the building types could have been more integrated, application of FBC could have been more comprehensive and the transect zone names could have been more conventional.
- The city was the anchor agency for the code formulation, adoption and implementation.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation was an integral part of the process at various stages.

Case Study 5: TOD Smart Code, Leander, Texas

1.0 Background

Leander, Texas has a population of approximately 13,846 people and is located at the northwestern edge of the central Texas growth corridor. Leander was set to witness much growth due to the construction of a tollway by the central Texas regional mobility authority and the regional commuter rail system by the Capital Metropolitan transportation Authority (Capital Metro), linking Leander and downtown Austin.

It was decided that the city would be the first in the region with a real TOD and would represent the initiative of a municipality planning ahead for development expected to result from projected transportation improvements. The code was an effective customization of the Smart code template. The involved stakeholders realized that regional rail transit and urbanism could be combined to create a sustainable growth pattern for the entire central Texas.

Structure of the code

- The primary goal of this process was to bring in regional TOD through planning, form-based codes reforms and leveraging the transportation facility to harness the sustainable, pedestrian friendly and mixed-use neighborhoods.
- All the code components including all zoning and subdivision standards, architectural guidelines, a localized plant palette, storm water drainage standards and street cross-sections were created.
- The Smart code template was approximately modified by 30% to create the final unified development code.

2.0 Organizing principle

The code adopted Transects as the organizing principle of the charrette master plan. The transect plan was formalized from the charette plan and became the regulating plan for the code.

Table No. 5: Table No. 5: Leander TOD Smart code

Scale	Part of a city/town
Implementation method	Mandatory and Freestanding
Site Context	Greenfield Redevelopment/ Infill
Site Size	2000 acres
Administration	Projects were reviewed by the city's urban design officer (UDO) and consolidated review committee that includes UDO and landowner representative, as called for in the implementation of a smart code.
Organizing principle	Transect (Smart Code)
Agency	City of Leander; Capital Metropolitan Transportation Authority.

3.0 Planning Context

To ensure appropriate character of development the code included the following:

- The code mandated minimum mix of housing types for each project to ensure that people could move up with out moving out of the neighborhoods.
- The code included specific street cross sections that were tailored for each specific major arterial road.

4.0 FBC Approach

4.1 Review, Access, Plan and Design

- The intended TOD was to be developed adjacent to Leander's downtown called old town. Approximately 2,000 acres of land was available near the old town and the landowners of that parcel of land eventually became part of the development process when they realized the potential of the development.
- A compelling fiscal impact analysis was conducted which concluded that the 2000-acre FBC based development would add \$1 billion to the tax base as compared to the conventional development.

Figure 9 | **Perspectives from Visioning Process**



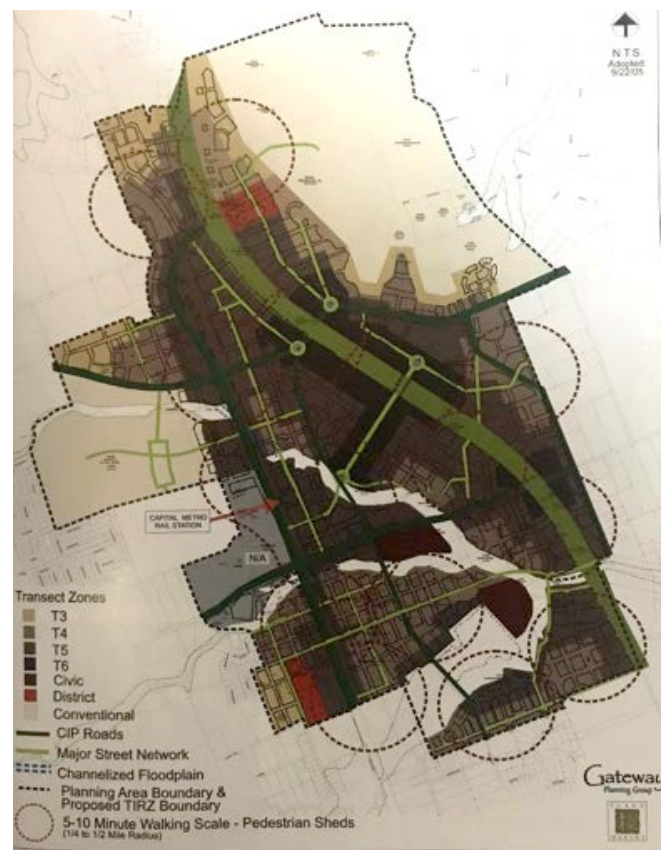
- Consensus emerged amongst the stakeholders and it was decided to proceed in the public-private partnership mode with detailed planning and code development funded jointly by the major landowners, the city and Capital metro.

4.2 Public Participation

- The city of Leander hosted a public presentation to kick-off the seven-day design charrette and a closing presentation.
- During the charrette, design elements and policies that needed to be implemented into the smart code were tracked.
- After the charrette a draft of adapted smart code was circulated amongst seven major landowners, the city and the city attorney. It took about four months of iterative process to facilitate the unified development code. The same was presented to the planning commission and city council.
- Thereafter, a three-item package was presented to the city council for necessary adoption. It consisted of an

agreement with landowners for annexing the land parcels that were not part of the 2,000 acres, Leander TOD regulating plan for 2,000 acres and the Smart code as the new unified land development code.

Figure 10 | **Leander TOD Regulating Plan with Pedestrian sheds**



5.0 Administration

The code was administered by Urban design Officer (UDO) and a consolidated review committee (CRC). The CRC was composed of the UDO, additional city staff representatives and land owner representatives.

The UDO not only served as city's staff for Leander's TOD and the Smart Code, but also as the coordinator of policies to implement the long-term financing of the project through support of the Tax Increment Financing (TIF) Board.

6.0 Learnings

- The fiscal impact analysis of the Form-Based code proved to be the critical educational tool in implementing a successful plan for urbanism. It also was instrumental in developing a Public-Private partnership approach to the whole process.
- The code contextualized the Smart code template as per the requirement.
- The code focused on selective neighborhood/ area level implementation.
- The Urban design Officer (UDO) and a consolidated review committee (CRC) was the anchor agency for the code adoption and implementation.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation was an integral part of the process at various stages.

Case Study 6: Heart of Peoria land development code, Illinois

1.0 Background

Peoria city is located along Illinois river and has a population of approximately 113,000 people. The Peoria Business community had developed a vision plan for the core area called the Heart of Peoria Vision Plan. It had four redevelopment "vision areas" and intended to add balance to the core of the city. These four vision areas were called as "Form districts." The plan was endorsed by the Peoria city council.

The Vision plan included the recommendation for more detailed planning work for designated redevelopment areas. However, despite a community-based vision plan, no concrete changes were observed on the ground. At this point the city realized the contradiction between the existing regulations and the vision plan.

To realize the recommendation and bring in concrete changes, the task to develop zoning ordinance for the core area into a unified development code was undertaken which was called the Heat of Peoria land development code. The city council established the Heart of Peoria commission for implementing the recommendations.

Structure of the code

A unified land development code was created based on the existing zoning regulations, subdivision regulations and the learning derived from the four vision areas. The code was developed for four sub areas in the historic core of the city. It followed two approaches:

- Concision using imagery for easy understanding of the code.
- Integration of the Form-based zones (form districts) in the conventional code that required careful demarcation of form-based zones. These zones were integrated into conventional codes as an update. The specific areas selected for Form-based codes application were carefully considered and boundaries were ear marked for each area as the vision plan evolved.

- The option for future expansion of FBC areas called the "planned form district" was included in the code. The intent was to allow expansion of FBC areas through a formal process.

Scale	Part of the city/ Town & Site specific (four specific) redevelopment "form districts".
Implementation method	Mandatory and Integrated
Site Context	Redevelopment/ Infill Greyfield
Site Size	8000 acres
Administration	City/County Staff
Organizing principle	Frontages
Agency	City of Peoria (Led by Planning and Growth Management department)

2.0 Organizing principle

The code adopted frontages as the organizing principle for addressing how the buildings defined and engaged the public realm.

3.0 Planning Context

The vision plan and Form-based code included the following to ensure that unique aspects of urban form of Peoria. The code also included the option for expansion of FBC area called the "Planned form district".

- **Revitalizing Pedestrian -Oriented commercial centers and corridors:** This section was introduced to reinvigorate the neighborhood commercial centers and main streets as vibrant social centers. The vision plans, and codes were created to remove regulatory obstacles that were prohibiting the revitalization of such areas into vibrant social centers.
- **Utilizing unique aspect of the community:** This section was included to introduce adaptive reuse of warehouse historic buildings and new buildings in character with them to create a mixed-use neighborhood that was unique to Peoria.

Figure 11 | Warehouse district photo simulation of proposed changes



4.0 FBC Approach

4.1 Review, Access, Plan and Design

The city planning authorities conducted a series of workshops and public participation (residents and business community) charettes for developing the urban design codes and form-based codes. An interdisciplinary team was assembled to take up the task of redevelopment of the historic core of the city. The vision plan was considered as a starting point. Physical urban design, traffic and transportation considerations, and economic and market conditions were reviewed in greater detail.

4.2 Public Participation

Extensive public participation design charrettes were conducted to develop codes for four vision area that were called as "form districts". Intensive week-long design charrettes were held for developing the codes. These public consultations had participation of representing citizens, businesses, property owners, commissions, city planning staff, elected members etc. The end results were detailed urban design and form-based codes for each of the four vision areas or form districts which influenced the approach for entire heart of Peoria code.

5.0 Administration

The city planning authority was the nodal agency for the code and was involved in the development and evolution of the code.

6.0 Learnings

- The code was developed for the historic core of the city and could also be looked at as special area regulation. However, it provided the methodology which could be applied to the entire city.
- The city planning authority was the anchor agency for the undertaking the development and implementation of the code.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation was an integral part of the process at various stages.
- The focus was to develop integration of built form with public realm.
- This code gave the application at area level.

Case Study 7: Form -Based Codes for mixed use infill, Sarasota County, Florida

1.0 Background

Sarasota county is located on the western coast of Florida, south of Tampa, with a population of 336,256 people, as per 2005 estimates. Sarasota county's undertook a review of existing and proposed regulations and ordinances of the 2050 vision plan to ascertain if it would enable implementation of higher densities in mixed-use developments in a largely suburban community. The task was later expanded to include formulation of a new Form-Based Code (FBC) and included mandatory charrettes for early inputs from the stakeholders.

Previously, the county officials had adopted a floating-zone infill code that contained many form-based codes techniques. However, the same was not adopted by the developers due to insufficient flexibility especially for infill sites. Eventually the officials agreed to provide flexibility in the codes, if the developer adopted charrettes to develop the plans.

Structure of the code

- The code was developed to fulfill the county's goals of higher densities in mixed-use developments.
- Application to selected growth areas: where communities were interested to develop mixed use infill developments. Every infill site had its own constraints and hence the code identified the core components of urbanism and allowed customization as per the site requirements.
- In this each site was planned through a charrette-based process for which there was a prescribed handbook. The developers who agreed to undertake the full charrette process could adopt those form-based codes.
- County approved design firms: The developers of the infill sites had to choose from county approved design firms for creating the vision and regulating plans for their sites.

- Three-dimensional code graphics: Unlike other codes, this code included illustrations and building types in perspective diagrams along with photographs for easy understanding.

2.0 Organizing principle

The code adopted transect zones, building types and street types as the organizing principle for regulating Infill development.

Table No. 7: Sarasota County Form-Based Code for Mixed-Use Infill	
Scale	Neighborhood (Designated growth nodes from Comprehensive Plan)
Implementation method	Floating Zone/ TND
Site Context	Redevelopment/ Infill and Greyfield
Site Size	12275 acres
Administration	County Staff, rezoning approval for each infill site is required by the Board of County Commissioners
Organizing principle	Transect
Agency	Sarasota County Board of County Commissioners.

3.0 Planning Context

To ensure appropriate character of development the code included the following:

- A Variety of street types provided within the FBC: This section was introduced to provide standard designs of street types and building types with flexibility to modify. This code provided 14 acceptable street types and 12 acceptable building types.
- Block Standards: This section was included to introduce strict standards for block sizes as creation of a scaled street network was one of the most critical factors especially for sites without walkable street networks.

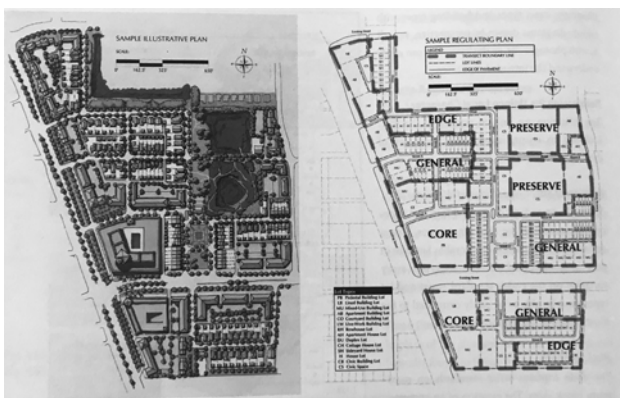
- Compatibility with existing adjacent development: This was introduced primarily to stitch perimeter suburban development to the infill development under question and gain community consent through public participation.
- New Storm water requirements: This section was included to override the existing storm water management requirements which focused on fragmented retention as it was proving difficult to use and was a deterrent in creating walkable neighborhoods.

4.0 FBC Approach

4.1 Review, Access, Plan and Design

- The Sarasota county comprehensive plan was the starting point for the code. It encouraged higher densities in mixed-use developments and calls for reuse and development of vacant or underutilized commercial parcels as mixed-use neighborhoods.
- A new floating code was created which could be adopted only if the developer undertook a full charrette-based planning process for infill sites.

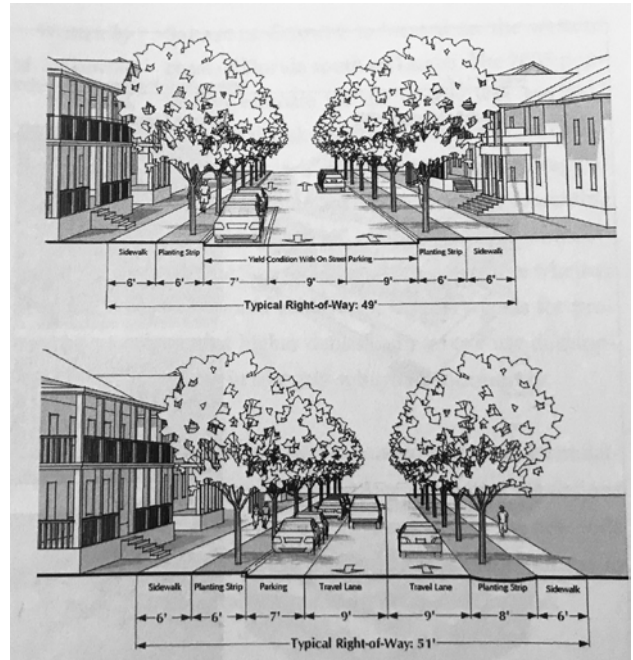
Figure 12 | **Prototypical illustrative (L) & regulating plan (R)**



4.2 Public Participation

- Two public processes underlie this code, namely the Sarasota 2050 visioning process and the Sarasota participation design charrettes. The adoption of this code followed normal process of legislation i.e. public workshops, planning commissions public hearings, and county commission adoption hearings.

Figure 13 | **Thoroughfare Street standards**



5.0 Administration

Rezoning approval was given by the board of county commissioners and all other approvals were given by the county who was also administrator of the code.

6.0 Learnings

- The code was developed to operationalize the high density in mixed-use development goal as stated in the county's comprehensive plan.
- The code focused on neighborhood level implementation while prioritizing site selection based on designated growth nodes from the comprehensive plan.
- The city ` county was the anchor agency for granting approvals except for rezoning approval which was granted by the Board of county commissioners.
- The development code ensured that contextual requirements we included and emphasized within the code.
- Public participation was an integral part of the process at various stages.

Case Study 8: Town Villages and Countryside, St. Lucie county, Florida

1.0 Background

St. Lucie county, Florida has a population of approximately 241,000 people. The Treasure Coast Regional Planning Council (TCRPC) advised the county officials to adopt Form-Based Codes technique to deliver the urbanism within towns and villages. It was decided that 28 square miles of development would be based on Form-Based codes. This area was located beyond the urban fringe of the city of Fort Pierce, in the unincorporated St. Lucie county.

This regional plan was called the "Towns, Villages and countryside" (TVC) Plan and was prepared by TCRPC.

Structure of the code

- St. Lucie county adopted the unified land development code combining all land development regulations, zoning, subdivision regulations and the sign code. The new form-based code was formulated to fit within the unified code.
- This code covered a large area of 28 Square miles that would house several towns and villages unlike other Form-Based Codes scale of application.
- One of the important considerations of the code was to preserve the countryside. It implemented a plan that preserved 60 to 75 percent of the rural landscape by transferring the existing development rights into pre-existing urban areas, new towns or villages. To achieve this application, the code created a pattern called "Floating Zone".
- This Form-based code allowed prospective developers of each new town or village to develop individual regulating plans. Each regulating plan had to allocate the entire land parcel into urban and rural transect zones and show the entire street network and proposed building types of the lots.

2.0 Organizing principle

Two organizing principles were used for this code namely the transect and lot (building) types. The Regulating plan had to designate both as well as the proposed street types

Scale	Region
Implementation method	Floating Zone/ Traditional Neighborhood development (TND)
Site Context	Greenfield
Site Size	18000 acres in North St. Lucie County
Administration	County Staff; rezoning approval for each town and village is required by the Board of county Commissioners.
Organizing principle	Transect Building types
Agency	St. Lucie County Board of County Commissioners

3.0 Planning Context

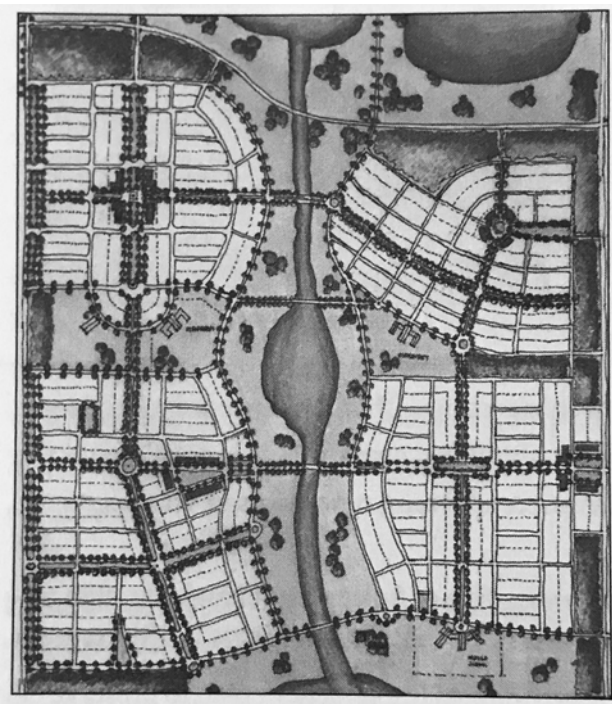
To ensure appropriate character of development the code included the following:

- A variety of street types provided within the FBC: The new patterns provided 11 type of streets types and 11 types of lot (building) types. However, the designers could add additional street types in individual towns and villages as long as they could be easily compared with the standard street types.
- Block standards: The codes contained strict standards for maximum block sizes as creation of a scaled street network was one of the critical aspects of the greenfield code.
- Preserving the rural character of the county: This code gave considerable attention to the rural areas and aimed to preserve 60 to 75 percent through transfer of

development rights. The aim was to avoid displacement to farmland from metropolitan areas and to continue supporting the farming activity at every scale.

- Addressing Regional storm water issues: The code allowed the development of a riverine surface water management system to handle storm water on a regional scale. It also aimed to repair environmental damages caused by the existing practices and develop a navigable recreational asset which would avoid fragmented retention basins that were a deterrent to walkability within towns and villages.

Figure 14 | **Prototype Plan for Neighborhood**

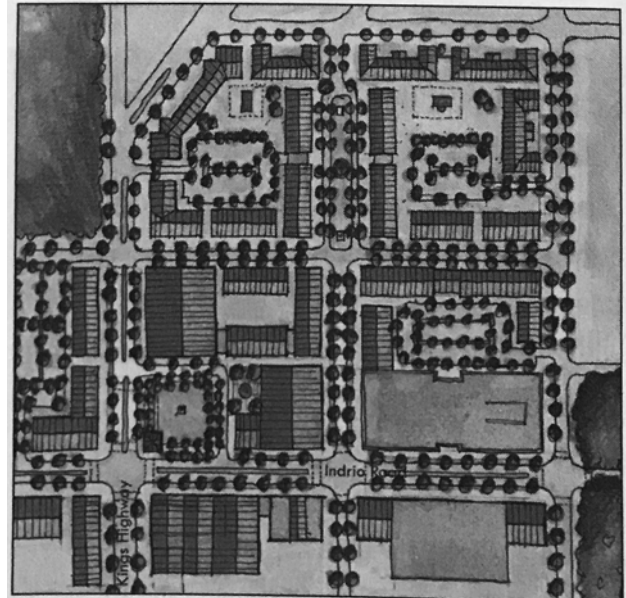


4.0 FBC Approach

4.1 Review, Access, Plan and Design

- The vision Plan was formulated based on charrette process.
- The plan amendments and new codes were drafted in consultation with the county staff. These were reviewed by several county appointed committees for necessary recommendations.

Figure 15 | **Prototype Plan for Village Center**



4.2 Public Participation

- Extensive charrette process was followed for public participation.
- The public participation was completed before the drafting of the code.
- No public participation was conducted for development of regulating plans of individual towns and villages as extensive participation and support was created while developing the Master plan for the entire area.

5.0 Administration

County staff would administer the code. However, the rezoning approvals were given by the board of county commissioners. TCRPC was contracted by the county initially for administration of the code and for training the county staff.

6.0 Learnings

- The code was developed for the regional level intervention and was for a greenfield area.
- The primary intent of the code was to bring in urbanism while preserving the rural character of county.

- In the process it was observed that the adoption process of the code was longer and complex which in turn affected the approval process of towns and villages projects and made them expensive.
- An important learning is that the state laws and county ordinances needed to be revised to support citizen's vision and the public agency needed to have adequate staffing and professional expertise to effectively manage the process.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation was an integral part of the process up to the development of the larger Master Plan. For individual towns and villages, the same was not conducted.

Case Study 9: Chandigarh

1.0 Background

The city of Chandigarh was conceived immediately after India's Independence in 1947 as the new capital city for the east of Punjab. The intent was to create a new town that was symbolic of India's freedom and a step into the future. Chandigarh was the first planned city of India after independence and the first city of India to adopt the Form-Based Codes approach for development especially the Capitol Complex and the City center. Today the city is known in the entire world for its Architectural and Planning controls. Besides, it has also inspired new cities like Naya Raipur in the current context.

Structure of the code

The code or the Design guidelines was prepared for the entire city primarily to control the Architectural features of the development and how it interacted with the public realm.

2.0 Organizing principle

The code adopted Architectural controls as the organizing principle for addressing the quality of the public realm.

3.0 Planning Context

- The development of the city was guided by the Master plan where the primary module of the city's design was a Sector- a self-sufficient neighborhood unit with shops, school, health centers and places of recreation and worship. Every sector was introverted in character and permitted only 4 vehicular entries into its interior. The central green of each Sector also stretched to the green of the next sector. Form-Based codes were adopted for the city to maintain its Architectural character.
- Architectural Controls: This was introduced to prescribe all the compulsory architectural features- verandah, height, basements, façade, signages, construction systems, compulsory architectural features for commercial buildings (including offices, hotels, etc.),

Figure 16 | Chandigarh sector-17 plan

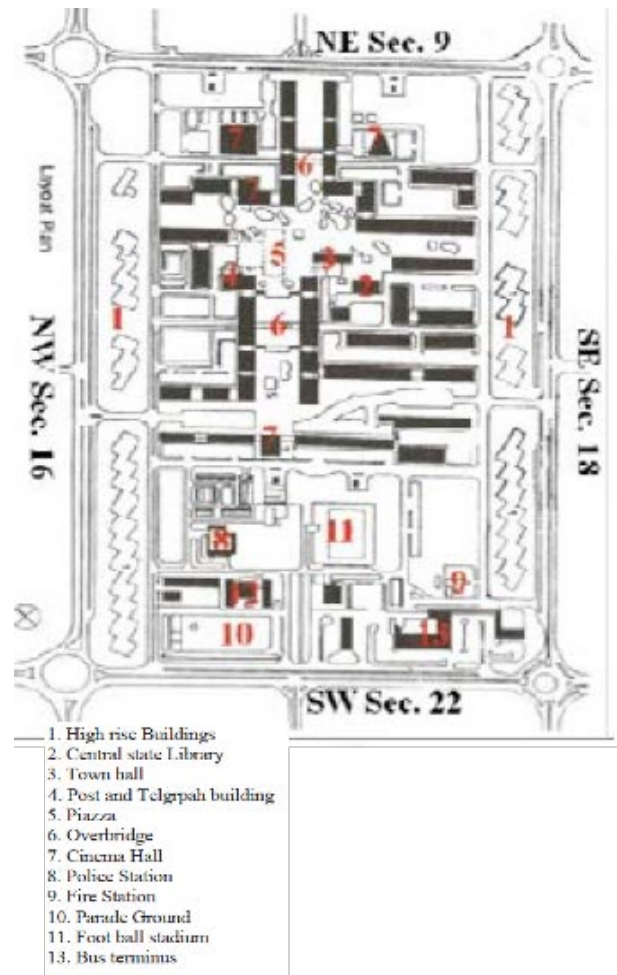


Figure 17 | Four storey commercial building view



Figure 18 | **Secetor-17 commercial plaza**

4.0 FBC Approach

4.1 City Level Planning context

- The overall city master plan was developed keeping several considerations in view like gradient of land, suitable soil conditions for development and overall location of the site.
- Urban controls in Chandigarh were designed to operate at three levels namely the city center, the periphery and the neighborhood level. Elaborate thought was given to the traffic circulation of the city while including not just motorized vehicles but also non-motorized transport and pedestrian infrastructure. Hierarchy of traffic circulation was designed ranging from: arterial roads (V1), major boulevards (V2) sector definers (V3), shopping streets (V4), neighborhood streets (V5), access lanes (V6) and pedestrian paths and cycle tracks (V7s and V8s).
- Architectural controls were applicable specially to buildings to be built by private enterprise in special areas of architectural interest such as V-2 roads, V-4 roads, City Centre etc.
- Open spaces and green areas were given due consideration while designing the city. At the city level, the open space consisted of the Leisure Valley and special gardens. At sector level, the open space constituted the central green in each sector whereas open space at community level consisted of parks around which clusters of houses were arranged. The smallest category

of open space was the courtyards provided in each dwelling on the front and rear side.

4.2 Design Guidelines

Several mechanisms were conceived to curb undue individualism in the built environment, and development of private buildings in the city. These included architectural controls, frame controls and zoning controls in the city. The basic aim was to maintain uniformity in skyline, heights and the architectural character. Depending upon the size and location, each plot of land in the city was governed by the specific use and building volume that could be developed on it through 'zoning restriction'. Minimum standards of light, ventilation, living area and sanitation were setup.

5.0 Administration

The Department of Architecture in Chandigarh Administration was the nodal agency for the code.

6.0 Learnings

- The code was developed for a new city and with an intent to strongly control the aesthetic of the city as well as each component of the city.
- The city administration was the anchor agency for undertaking the development, implementation and maintenance of the code.
- The development code ensured that contextual requirements were included and emphasized within the code.
- Public participation was not part of this city development essentially because it was a new city in the making at the time it was conceived.
- The focus was to develop integration of built form with the public realm.
- Certain amendments are being made to the original code of the city for redevelopment of dilapidated buildings. Besides, many code violations are also observed like hording placements, building facades, A/C placements etc. which is changing the original character of the urban form.

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Figures source

All the figures are sourced from web site listed under each case example and from the book Form Based Codes: A Guide for Planners, Urban Designers, Municipalities, and Developers as mentioned under references.

Other Suggested readings

References and links to other Form-based codes can be found on Form-Based codes Institute web site: www.formbasedcodes.org

- Implementation of Form-based codes and Value capture: <https://www.gatewayplanning.com/implementation.php?page=20>
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