14 CHANDIGARH VILLAGES

14.1 AN OVERVIEW

The Development Plan for the 16 kms belt around the Master Plan brought under the Punjab New Capital (Periphery) Control Act, 1952, prohibited all building activities for non-agricultural purposes to maintain a green belt around the city. However ‘Abadi Deh’ areas of the villages falling in the Periphery Control Area were exempted from the provisions of the Act subject to certain restrictions.

Following reorganization of the State of Punjab in 1966, the Periphery Control Area got divided between the States of Punjab, Haryana and U.T Chandigarh with majority of share going to state of Punjab.

Haryana modified the Act marginally to provide a maximum height of 11 meters for construction of residential buildings in the *abadi deh* of villages, prohibiting their use for commercial purposes. Punjab, on the other hand, permitted change of land use of various pockets for setting up residential colonies and institutions. Starting with Mohali and Panchkula, over the years, both states have also permitted large scale urbanization in the periphery.

In the case of Chandigarh, Phase-I of the city was built on a clean state. Not only the agricultural land but also the area falling under the *abadi deh* was also acquired and taken up for development as part of the sector planning. However, in the second phase *abadi deh* of four villages, namely Burail, Attawa, Buterla and Badheri, whose agricultural land was acquired, was excluded from the acquisition and were integrated as part of the sectoral plan.

The *abadi deh* areas of Kajheri and Palsora villages falling in Sectors 52 and 56 respectively, whose land was later acquired for Phase III sectors, were also left unacquired.

To check haphazard development, the *abadi deh* areas were declared as ‘Site of the Capital’ under Section 1(2) of the Capital of Punjab (Development and Regulation) Act, 1952, and brought under the purview of that Act. However, these villages were excluded from the purview of the Punjab Capital (Development and Regulation) Building Rules 1952, and building byelaws were not made applicable in these old built up areas.
14.2 THE PRESENT STATUS OF VILLAGES IN THE UT OF CHANDIGARH

At present, the Union Territory of Chandigarh has 23 villages. **Manimajra on the eastern edge of the city,** which was a small village at the time of preparing the original plan has developed as a Census town. The town has been made an integral part of the Chandigarh Master Plan.

**Villages in UT Chandigarh**

The villages falling in UT have broadly been categorized as
- Sectoral Villages and
- Non Sectoral Villages.

**Sectoral Villages**

**Villages in the Second Phase** - Burail (Sector 45), Badheri (Sector 42) Buterla (Sector 42), Attawa (Sector 42)

**Villages in the Third Phase** - Kajheri (Sector 52), Palsora (Sector 55)

**Non Sectoral Villages**

**Northern Periphery**
- Kaimbala near the foothills of the Shivaliks near the North Eastern boundary
- Khuda Ali Sher near the foothills of the Shivaliks - North Western edge abutting the Sukhna Wild Life Sanctuary.

**Western Periphery**
- Khuda Lahora - Mullanpur - Chandigarh Road
- Khuda Jassu – Mullanpur - Chandigarh Road
- Sarangpur on the Mullanpur – Chandigarh Road
- Dhanas across the Patiali Ki Rao
- Dadumajra on the extension of the Shanti Path at its western end and in close proximity to the Patiali Ki Rao
- Maloya near Water Works, Sector 39.

**Eastern Periphery**
- Kishangarh across the Sukhna Choe near the Regulator End of the Sukhna Lake is prominent from the Sukhna Boulevard
- Hallomajra on National Highway 21
- Behlana near the Chandigarh Airport
- Daria near the Chandigarh Railway Station
- Mauli Jagran near the Interstate Boundary with Haryana
- Makhnan Majra between Sukhna Choe and Railway Line
- Raipur Kalan within Industrial Area Phase-III
- Raipur Khurd near NH-21
While acquiring the agricultural land of the villages falling within the sectoral grid, it was thought prudent that the basic infrastructure and amenities lacking in these villages shall be made available as integral part of the sector planning. In addition the residents of the villages would share the social and physical infrastructure including education and health care etc. In order to regulate building construction in these villages, from time to time, Chandigarh Administration issued directions under Section 4 of the Act relating to the height and land use of buildings.

The running of dairies and keeping milch cattle was also prohibited for creating appropriate living environment in the villages.
VILLAGES WITHIN THE SECTORAL GRID OF CHANDIGARH –LOCATION

Buterla

Kajheri

Badheri

Attawa

Bural Village
Non Sectoral Villages Falling in the Western Periphery Villages of Chandigarh

- Sarangpur
- Dhanas
- Dadu Majra
- Maloya

Khuda Lahora and Khuda Jassu
14.3 DEVELOPMENT OF VILLAGES UNDER MC CHANDIGARH

With the creation of the Municipal Corporation of Chandigarh (MCC) in July 1994, nine villages have been brought under the MCC while the rest are still rural and governed by elected Gram Panchayats.

The villages under the MCC are Burail, Badheri, Attawa, Hallomajra, Palsora, Dadumajra, Maloya, Kajheri and Buterla.

The unacquired non-\textit{abadi} deh land which some of these villages still have, continues to come under purview of the Periphery Control Act., 1952.


These Rules initially extended to the entire unacquired area of the revenue estates of villages comprised/included in the Municipal area of Municipal Corporation of Chandigarh, including the area under the \textit{abadi deh}.

However, the rules have been amended from time to time. At present the "Act" is applicable to \textit{abadi area} of villages Maloya, Palsora, Kajheri, Dadumajra and Hallo Majra, but the "Building Rules" are not applicable to these villages including the area under \textit{abadi deh} in terms of the Rules notified on 16.11.2006.

These rules restrict the maximum building height to 34 feet but permit a height upto 45 feet as an incentive if owners along a whole street are willing to surrender 4 feet 6 inches on both sides for street widening.

Private developers undertaking redevelopment of a part of an existing village are permitted a maximum height of 72 feet (upto 7 storeys) for residential buildings and 58 feet for commercial buildings.

However these rules have created anomalous situations leading to high degree of densification of the congested \textit{abadi} area besides creating non conforming uses. Further these rules have been violated with impunity and have emerged as the major road block and source of nuisance for the adjoining planned area. The \textit{abadi deh} area has also been subjected to a lot of speculation leading to commercialization of the area. In the process, as evident from confusing picture of the laws and rules, these centres have become centers of the informal urban economy and a perennial source of environmental pollution.
14.4 VILLAGES OUTSIDE SECTORAL GRID

The rural villages are Khuda Ali Sher, Khuda Jassu, Khuda Lahora, Sarangpur, Dhanas, Behlana, Raipur Khurd, Makhan Majra, Dariya, Mauli Jagran, Kishangarh, Kaimbwala and Raipur Kalan.

- Development outside the Abadi Area

All villages have varying extents of unauthorized construction even outside the extended abadi area. As per the information made available by the Department of Rural Development and Panchayats, the area under unauthorised development beyond the abadi areas is nearly three times the abadi area in some of the villages as detailed in Table 1. Plans showing development outside abadi of villages within the sectoral grid and outside the sectoral grid are shown as Plan 1 to 6 and 7 to 19 respectively on next pages. Of the total area of 6334 acres of villages - Khuda Ali Sher, Khuda Jassu, Khuda Lahora, Sarangpur, Dhanas, Behlana, Raipur Khurd, Daria, Mauli Jagran, Kaimbwala and Raipur Kalan, 125 acres falls under the abadi deh and 104 acres under extended abadi. Unauthorized construction beyond Lal Dora is to the tune of 254 acres.

The Table and the Plans indicate that Village Daria which has 4 acres under adabi deh has 102 acres of unauthorized construction around it. Due to proximity to the railway station, large number of godowns/commercial establishments have come up in and around the village in violation of the Periphery Control Act, 1952. See Table 14.8.

Villages have recorded high rate of growth in the last decade. During the 1991-2001 decade, the rate of population growth of Chandigarh’s rural areas was almost four times that of the city as these villages are meeting some of the unmet demand for cheaper housing.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Village</th>
<th>Total Area (in acres)</th>
<th>Area under Red line (in acs.)</th>
<th>Area under extended Abadi (in acs.)</th>
<th>Unauthorized construction beyond Lal Dora (in acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kaimbwala</td>
<td>899</td>
<td>8</td>
<td>8</td>
<td>36</td>
</tr>
<tr>
<td>2.</td>
<td>Khuda Ali Sher</td>
<td>564</td>
<td>25</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>3.</td>
<td>Khuda Jassu</td>
<td>482</td>
<td>03</td>
<td>04</td>
<td>25</td>
</tr>
<tr>
<td>4.</td>
<td>Lahora</td>
<td>776</td>
<td>07</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Sarangpur</td>
<td>673</td>
<td>17</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>6.</td>
<td>Dhanas</td>
<td>723</td>
<td>13</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>Behlana</td>
<td>499</td>
<td>06</td>
<td>05</td>
<td>17</td>
</tr>
<tr>
<td>8.</td>
<td>Raipur Khurd</td>
<td>225</td>
<td>04</td>
<td>05</td>
<td>30</td>
</tr>
<tr>
<td>9.</td>
<td>Raipur Kalan</td>
<td>225</td>
<td>12</td>
<td>08</td>
<td>5</td>
</tr>
<tr>
<td>10.</td>
<td>Mauli Jagran</td>
<td>583</td>
<td>26</td>
<td>05</td>
<td>9</td>
</tr>
<tr>
<td>11.</td>
<td>Daria</td>
<td>185</td>
<td>04</td>
<td>05</td>
<td>102</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5834</td>
<td>125</td>
<td>104</td>
<td>254</td>
</tr>
</tbody>
</table>

Source: Department of Rural Development Panchayat

Considering the large population pressure these rural areas are likely to be subjected to further pressure due to lack of space within the sectoral grid, external pressures of development around the neighboring towns falling in close vicinity. The construction/extension of major roads, along which these villages fall, will further add to pressure.
Plan 1 to 6 - Development outside the Abadi area of villages falling within the Sectoral grid

Villages within the Sectoral grid

Villages Palsora and Kajheri which fall within the third phase sectors and are partially developed have unauthorized construction in adjoining areas.

Village Attawa and Burail within fully developed sectors and have no scope for horizontal expansion and are expanding vertically.
Plan 7 to 13  Development outside the Abadi of villages outside the Sectoral grid

Abuts the Sukhna wildlife sanctuary

On the north of the Capitol Complex

On Chandigarh-Mullanpur road

On PGI- Mullanpur road

Adjoins Airport

Near Sukhna Choe

On Western Periphery
Plans 14 to 19 - Development outside the Abadi of villages outside the Sectoral grid

Close to National highway-21
Near Sukhna Choe
Near Railway Station

Close to National highway-21
On Western Periphery
Within Industrial Area

Source: Department of Rural Development Panchayat, UT, Chandigarh
Deprived of their cultivable land and even barred from keeping livestock, the inhabitants of villages particularly within the sectoral grid have switched to a wide diversity of occupations and activities based on the opportunities offered by Chandigarh. In fact, these are not villages any longer but have become urban bastis/mohallas/colonies within the city with transformed socio-economic fabrics reshaped through interaction with the city. Although the cores of these villages still retain their organic physical character, in the absence of effective development controls and lack of enforcement of rules, they have transformed drastically from largely residential to mixed land use in a haphazard manner. Most villages have shops catering to the basic needs of the inhabitants and specific needs of the City. Some are carrying out small scale manufacturing including making of eatables/sweets and snacks which are sold in the City.

Burail, Badheri and Buterla within the sectoral grid have extensive commercial activity ranging from tyre retreading, car repair, welding, furniture making, selling TVs, upholstery, etc along wider peripheral roads with incidental shops and godowns for city shops on narrow internal streets.

The commercial activity in Burail is spilling onto the residential areas of the adjoining sector and has become a source of nuisance.
14.6 **VILLAGES LACK ADEQUATE PROVISION FOR FIRE SAFETY**

- Illegal go downs/commercial establishments on narrow streets
- Commercial activity on upper floors having improper access
- Narrow lanes inaccessible by fire tenders/emergency materials
- Absence of designated space for parking of fire tender/fire tender movement around the village
- Congestion on approach roads due to haphazard parking, mix of vehicles and NMT
- Results in delay in rescue operations
- Shops storing inflammable material
- No provision of water for emergency vehicles
- Fire safety measures not taken within commercial establishments
- Narrow passages between stored material

**RECENT FIRE INCIDENT IN VILLAGE BURIAL**
Burail Village

HEAVY TRAFFIC GENERATING

CHANGE OF LANDUSE FROM RESIDENTIAL TO HOTEL

TRAFFIC CONGESTION ON V4 OF SECTOR 45 DUE TO COMMERCIAL ACTIVITIES
Dumping garbage treatment plant along Patiali-ki-Rao, Dadumajra. The city’s garbage disposal sites are located towards the western periphery of the city. The residents resent the air pollution and smell generated.
Dhanas Village

Chandigarh Master Plan – 2031

Expanses of Green

Land Under Cultivation – Dhanas

Prone to Pressure of Development

Cattle Rearing within Residential Plots

Community Space around Tree – Village Environment

Village Pond – A Rare Sight

There are only eight villages with ponds; the rest have been converted into parking lots/parks.
Cheap Dormitories / Single Room Tenements - Residential houses have been converted into cheap dormitories/single room tenements - in some cases as many as 27 families have been accommodated in a 12 marla house with provision of only one kitchen/toilet per floor. The rooms lack proper light and ventilation.

High-rise Guest Houses/Hotels have come up in large number in villages across the city. These are being used regularly by institutions for boarding and lodging. Working class people who cannot afford housing in the city have found cheap accommodation in these localities, adding to the congestion.

There is a concentration of guest houses in Burail, Kajheri, Daria, Attawa and Manimajra which are being used due to the proximity to bus and rail terminals. Enjoying good clientele guest houses are more profitable as compared to renting out the premises.

Substandard and unsafe buildings
Structural safety is low priority. The construction of the buildings is going unchecked and substandard and unsafe buildings are coming up which are without adequate light and ventilation, have inadequate access to upper floors. While constructing basements, the requisite safety measures/setbacks from neighbouring properties is not being maintained which can endanger life and property.

These buildings constructed on both sides of narrow roads also make no provision for parking resulting in parking on roadside and thus causing traffic congestion and bottlenecks.

Make shift arrangements for drawing electricity through loose hanging wires are an open invitation to disasters.

Illegal mobile towers on residential buildings, dairies and manufacturing units including non-conforming uses
The Hygiene and sanitation particularly in the narrow lanes in the core of the villages is very poor and open storm water drains, which are mostly blocked, add to the stench and filth. Manufacturing of sweets on unhygienic conditions a health hazard for the residents.

Tardy Garbage Disposal is another factor adding to unhygienic conditions. There is acute shortage of any play grounds and open spaces.

Balconies overhang on to the narrow lanes thereby adversely impacting light and ventilation.

As one proceeds outwards from the core, generally the streets are wider and houses are bigger. These are relatively newly built areas and conditions are better as compared to the core of the village. A circular road to mark the phirni has been constructed in most villages. Over the years the administration has done considerable development work to improve the quality of life. There is running water and sewerage for each house, the narrow lanes have been brick lined/ black topped and electricity provided.

Villages outside the sectoral grid
The nature of problems of the abadi deh of these villages are similar to those of the villages under the MCC although these are less acute, especially in villages away from the major roads/highways/railway station.

Absence of Building Byelaws
Till now, there are no building byelaws applicable in the area within the Lal Dora and the extended abadi of the villages controlled by the Panchayats. Many of the inhabitants are still engaged in agriculture as not all the agricultural land of these villages has yet been acquired.

Commercial establishments /Godowns
Many villages have large number of commercial establishments both within and outside the abadi area. Table 14.1 to 14.8 (refer annexure) indicate the number of commercial establishments in the villages outside the sectoral grid. Village Daria has the maximum number followed by Village Dhanas and Village Mauli Jagran.
Other issues

All villages are under great pressure of development. The extent of the pressure is related to the location of the village with respect to traffic major arteries, proximity to commercial centers, transport nodes, work centers, Industrial Area.

Due to the Capital of Punjab (Development & Regulation) Act 1952 not being applicable to the abadi deh of villages, they have also developed mixed land use; high densities leading to insanitary conditions; un-regulated development in terms of height and coverage.

Most of the buildings within the village phirni are still single, double or three storied, however in the absence of any regulations, multi storied buildings have started coming up which needs to be checked urgently.

Some villages such as Kaimbwala, Maloya and Khuda Ali Sher still retain their rural character and carry out agricultural activities.

Some villages are facing flooding problems and untreated sewerage is thrown into the choes. Construction activity within the discharge area of the choes is further aggravating the flood problem.

Villages close to Sukhna Wild Life Sanctuary are being subjected to extensive development activity which is detrimental to the flora and fauna of the sanctuary.

Villages located on the proposed East West Metro Corridor are likely to undergo intensive development if left unchecked.

Haphazard and unplanned development of villages along the major interstate arteries/ roads important from the urban design point of view.

Absence of adequate land to meet the growing needs of the villages.
Village ponds

Ponds have been an integral part of villages. Over the years, however, ponds of a number of villages including Daria, Raipur Khurd, Mauli Jagran, Kajheri, Hallomajra, Behlana have been converted into parks, in a few cases eg Khudda Lahora the same are used for parking. As per feedback provided by the Rural Department village ponds still exist in the following villages:

- Dhanas 01 no.
- Sarangpur 01 no.
- Khuda Jassu 01 no.
- Khuda Alisher 01 no.
- Kaimbwala 02 no.
- Behlana 01 no.
- Khuda Lahora 01 no.

Some of the villages with the Municipal Corporation including Dadumajra, Kajheri, have also retained their ponds.

The pond in Village Dadumajra has been recently revitalized and the area now serves as a major recreational area for the villagers.

Overview of problems of villages

- Illegal changes of land use
- Encroachments on public land
- Inadequate infrastructure
- Open drains, poor garbage disposal and sanitation
- Discharge of sewerage into choes
- Filling up of existing ponds/poor maintenance of surviving ponds
- High degree of traffic congestion,
- Large scale non-conforming industrial activities,
- Lack of structural safety measures in construction,
- Disposal of cow dung into open drains,
- Flooding and poor availability of air, light and ventilation for healthy living
- High fire prone areas.

PONDS IN KAIMBWALA

Construction of School and village Kaimbwala
14.8 PROPOSALS OF CMP 2031

A Perspective for the development of UT’s Villages

The following guidelines are proposed for regulating the development of villages falling within the sectoral grid.

All villages should be planned and developed within the identified framework of development. Accordingly it will be desirable that detailed planning of the villages should be undertaken based on detailed studies.

Each village needs to be surveyed in detail, including the help of satellite imagery, so as to record the extent and nature of construction and existing uses. The survey would include the following - existing landuse, building character/height of buildings, ownership - Government /Community land, Community Facilities / Places of Worship, Open Spaces, Sewerage, Drainage, Electricity, Road Network, Encroachments etc..

A pattern followed earlier in the planning of villages including Badheri, Hallomajra, Maloya, Dadumajra, could be taken as a model for preparing detailed plans of the villages.

Based on this detailed survey, a Development Plan should be prepared for each village considering the specific location, character, problems and pressures. Improvements in the street widths or provision of open spaces in the older areas in consultation with existing owners.

While planning care shall be taken to ensure that commercial establishments if any should be allowed basically to serve the needs of those living in the lal dora and are to be developed in a manner that they do not open onto main roads and have adequate parking.
The detailed Development Plan should be evolved based on:

- **Respect the history, unique character of the old *abadi deh* of each village and try to preserve and maintain its best features.**

- Most villages have old temples, other religious buildings as well as community spaces which need to be preserved. Similarly, some have old mango groves and water tanks needing protection and preservation.

- **Retain the rural character**
  Few villages in periphery such as Kaimbwala, Khuda Ali Sher, etc. have still retained their village character and carry out agricultural activities. It is proposed that land of these villages should continue to retain their rural character as per the original concept of the periphery and stipulated in the Punjab New Capital (Periphery) Control Act, 1952.

- **Insuring energy efficiency in Villages**
  The objective would be to make all the villages a role model of rural development by making them energy efficient by introducing measures such as use of solar energy, Bio Gas Plants, Rain Water Harvesting, adopting green building concepts, augmenting green spaces, provision of proper storm water drainage etc. in order to address the problem of energy, flooding, open spaces etc.
Providing basic infrastructure in the villages

- The objective of this is to strengthen the basic infrastructure in villages.
- Concretization of the village streets with a view to provide durability of streets and better drainage system.
- Sanitation and cleanliness needs to be institutionalized. Substantial proportion of population and localities in villages are bereft of the basic amenities like piped drinking water supply, sewerage system, storm water drainage etc.
- Installation of solar street lighting as a measure to conserve renewable energy resources.

Promoting rural tourism

With a view to attract tourists, it is intended to develop villages as Tourist Destinations, where the infrastructure and amenities for rendering services to the tourists will be created.
Framing model building bye-laws for the villages

The growth and development of the villages and the buildings to be constructed therein shall be governed by well defined building bye-laws addressing the specific need of these villages and retaining their basic character. The bye laws shall be framed after wide consultation with the rural population and experts having knowledge and experience of rural development. The model building byelaws framed by the Government of India shall also be considered while framing the rules. The byelaws would address the issues related to landuse, air light and ventilation, urban design, structural design, ethnicity, water conservation sustainability etc and integration with the surrounding development.

Growth and development of villages falling outside sectoral grid

The growth and development of the villages falling outside the sectoral grid shall be guided by detailed plan of the village evolved based on detailed study and mapping as in the case village falling within the sectoral grid. These plans shall not only meet the existing requirement of the population in terms of infrastructure and services but will also accommodate the future needs of living and employment. The development shall focus on making the village self contained and self sustaining in terms of all human needs. The basic character of the villages shall be promoted and retained while detailing out the planning and development strategies. In addition to creating basic infrastructure, quality of life shall be the guiding feature of the development.

Area around the abadi deh shall be identified for future growth and development. Planning parameters shall also form integral part of rural development. Landuses leading to increased employment opportunities shall be made integral part of the planning strategy. The planning shall also look at the possibility of integrating the existing development outside the abadi area as part of the development plan.

Some of this land around the villages could be added to the abadi deh to cater to bridge the gap in community facilities, open spaces and agro/village industry based economic activities.

The Chandigarh Administration has been constantly upgrading the social and physical infrastructure of the villages. Number of Dispensaries have been constructed in various villages and proposal for upgradation of dispensaries at Maloya, Hallomajra and Kaimbwala to the level of primary health centre as per Indian standard (iphs) have been initiated & dispensaries in and the process for construction of dispensaries in Khuda Ali Sher, Rehabilitation colony, sec. 52, Janta and Kumar Colony, Sector 25, Behlana. Government high schools are under construction in Bural, Raipur Khurd, Kishangarh and primary school is under construction in village Behlana.

All these developments should be integrated as part of the development plans to be prepared for the villages in order to ensure their optimisation in terms of location and utilisation.

Construction surrounding villages beyond lal dora

Large scale residential / commercial construction has taken place in the agricultural area regulated under the Punjab New Capital (Periphery) Control Act 1952 without obtaining permissions. It can be treated as unauthorized constructions. Appropriately, this matter should be dealt by the Administration taking into consideration legal provisions to see that the development of this area takes place as per the principles adopted for the drafting of this Master Plan.

Since the detailed development plan of the villages would take sometime for preparation and it is essential to provide more amenities to the inhabitants of the areas surroundings the villages which have come up in an unauthorised manner. It is recommended that in the interim period, basic amenities like water supply, sewerage etc. should be provided to the residents on purely temporary/provisional basis. It should be emphasized that this does not mean the recognition of the ownership of that land by the person using the same and shall not be construed as regularization of the area.
**Revitalizing village water bodies through the following methods**

**A. Aeration**
1. Aeration of water bodies for natural removal of weeds and algae on water surfaces
2. Aerated lagoons systems use aerators to mix the contents of the pond and add oxygen to the wastewater.
3. Wind driven aerators do not need external energy source for operating but other aerators do.
4. Still the energy production is far more economical than other mechanical methods
5. Aerated lagoons require less land area and shorter detention time for waste water

**B. Reedbeds**
1. Reedbeds an ecofriendly way to treat water which can be easily fitted into existing reservoirs or ponds.
2. What to do: A wide variety of native wetland flora can be planted on a mesh type structure. Plants can be planted either bare root or contract cell grown in 2 sizes of root trainer
3. Benefits:
   3.1 Easy to install
   3.2 Suspended solids removal

**C. Bioswales**
1. To treat water and cleanse it partially before releasing it in the pond / watershed
2. Bioswales are landscape elements designed to remove silt and pollution from surface runoff water.
3. The water’s flow path, along with the wide and shallow ditch, is designed to maximize the time water spends in the swale, which aids the trapping of pollutants and silt.
4. Treats the runoff before releasing it to the watershed or storm sewer.