

TOWN OF STONY PLAIN

BYLAW NO. 865

BEING A BYLAW OF THE TOWN OF STONY PLAIN IN THE PROVINCE OF ALBERTA TO  
ADOPT THE AREA STRUCTURE PLAN FOR THE SOUTH EAST AREA OF STONY PLAIN

WHEREAS, Section 62 of the Alberta Planning Act, R.S.A., 1980 enables a Municipal Council to adopt by bylaw, an Area Structure Plan for the purpose of providing a framework for subsequent subdivision and development of an area in a municipality.


AND WHEREAS, the South East Area Structure Plan addressed the requirements of an Area Structure Plan as outlined in Section 62(2) of the Alberta Planning Act, R.S.A., 1980.

NOW THEREFORE, the Municipal Council of the Town of Stony Plain duly assembled enacts as follows:

1. That this Bylaw should be cited as the South East Area Structure Plan;
2. That the South East Area Structure Plan attached thereto as to:
  - a) Layout the Proposed Land Uses
  - b) Proposed Sequence of Development
  - c) Proposed Traffic Circulation
  - d) Proposed Sanitary Sewer, Water, and Storm Water Systems.
  - e) Proposed School, Recreational and Open Space Locations and Systems.
3. This Bylaw commenced upon the date of it finally being passed.

DONE AND PASSED AS A BYLAW OF THE TOWN OF STONY PLAIN IN THE PROVINCE OF  
ALBERTA THIS 8th DAY OF August A.D., 1983.

  
MAYOR H. KOTSCHEROFSKI

  
MUNICIPAL SECRETARY  
J. VAN DOESBURG

READ A FIRST TIME THIS 11th	DAY OF July.	A.D., 1983.
READ A SECOND TIME THIS 8th	DAY OF August	A.D., 1983.
READ A THIRD TIME THIS 8th	DAY OF August	A.D., 1983.

**SOUTHEAST  
STONY PLAIN  
AREA  
STRUCTURE  
PLAN**



**Stanley**

**SOUTHEAST STONY PLAIN  
AREA STRUCTURE PLAN**

**March, 1983**

**Prepared For:** R. and B. Hennig  
The Town of Stony Plain  
Ellesmere Developments Ltd. and  
Terraventure Investments Ltd.  
Randall C. Wallace Professional Corporation

**Prepared By:** The Urban Development Group  
Stanley Associates Engineering Ltd.



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1 March 1983  
File: 56-2423-3-1-1

Mr. Mark Betteridge  
Director of Planning and Development  
Town of Stony Plain  
4905 - 51 Avenue  
Stony Plain, Alberta

Dear Mr. Betteridge:

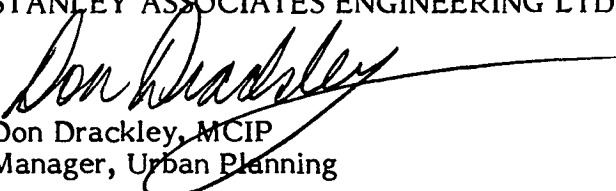
Reference: Southeast Stony Plain Area Structure Plan

On behalf of certain land owners in the W½ Section 30 and part of the E½ Section 25-52-28-W4, I am pleased to submit this Area Structure Plan document to the Town of Stony Plain for review and approval. The Plan represents a comprehensive approach to planning on these lands, reflecting substantial cooperation between the involved landowners. In accordance with the Alberta Planning Act and Town policies, this Plan offers appropriate information on environmental site features, development opportunities and constraints, ownership, land use distribution, circulation and movement, servicing schemes and general development phasing. The statistical results of the proposed land use scheme are also offered in conceptual form.

I trust that the Plan will be found in order, and result in a successful approval process for the benefit of both the owners and the Town.

Yours truly,

STANLEY ASSOCIATES ENGINEERING LTD.

  
Don Drackley, MCIP  
Manager, Urban Planning

DD/llg

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## SECTION 1

### INTRODUCTION

#### 1.1 MANDATE

The Southeast Stony Plain Area Structure Plan has been prepared according to the procedures and provisions of the PLANNING ACT and the Town of Stony Plain AREA STRUCTURE PLAN POLICY.

#### 1.2 PURPOSE

The intent of this Area Structure Plan is to set forth objectives, policies and a land use concept for the development of several parcels of land within the southeast quadrant of the Town. These lands are located directly to the north and northeast of the Westerra Institute of Technology site.

The decision to locate the Westerra Institute of Technology in Stony Plain was announced by the Province in April 1981. This decision has important consequences for the Town, in terms of benefits and growth. Construction of the Institute will commence soon, with completion of 122,000 square metres (1,311,000 square feet) of floor space planned by September 1987. The Institute will have 700 staff positions and an enrollment of 3500 full time equivalent students.

In conjunction with the benefits the Town will derive from the new Institute, such as increased direct and indirect employment, a broader tax base and increased attractiveness of the Town to potential industry and residents, it is expected that an activity of this magnitude will create major new demands to provide accommodation as well as educational, recreational and shopping services. The Institute will be a strong catalyst for growth within the Town of Stony Plain. A portion of the students and staff will

utilize existing commercial, professional and other services on their daily journeys in and out of the Town, while others will choose to live in Stony Plain.

The development of Westerra, and the resulting residential and commercial growth will continue the trend of decentralization in the Edmonton sub region that has resulted in rapid growth within the Town in the recent past. This growth in the Town of Stony Plain may result in a maximum population of 19,000 by 2000<sup>1</sup>. However, the recent Draft Regional Plan suggests a population target for the Town of 14,000 persons by 2006. Since the Draft Regional Plan has yet to be approved, and the Town's new General Municipal Plan is currently underway, the actual long-term population potential for Stony Plain is not known at present.

The most appropriate land within the Town that is feasible to be serviced in the time frame needed to facilitate required developments adjacent to the Westerra Institute of Technology is the area of Stony Plain covered by this Area Structure Plan.

The location of the Westerra Institute of Technology has emphasized the desirability of systematic planning and development in the neighbouring area, which is encompassed by this Southeast Stony Plain Area Structure Plan. The Owners Group for these lands initiated preparation of this Area Structure Plan mainly in response to the favourable conditions for development created by the choice of the adjacent NE ¼ Sec. 24 52 28-W4 as the Institute site. The following considerations, in particular, supported the decision to prepare the Area Structure Plan for the subject area:

- i) The Plan site is strategically located between existing development in Stony Plain, the Westerra Institute of Technology site, and the recently completed Stony Plain Municipal Golf Course.

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<sup>1</sup> Town of Stony Plain Submission for Annexation, Grief, Manzie, Dant, September 1979.

- ii) Demands are expected for provision of complementary services and accommodations for students and staff in close proximity to the Institute.
- iii) The requirement to service the Westerra Institute of Technology site has stimulated the design and construction of the Southeast Stony Plain Trunk Sewer. This major capital works project funded by the Provincial Government focuses future development in the southeast quadrant of Stony Plain. Construction of this trunk sewer makes development of the Plan area feasible from both a financial and physical standpoint.
- iv) A continuous urban network and linkage system between major urban nodes in Stony Plain, specifically the existing core district and major recreational and educational facilities, will add to the aspects of convenience, amenity and a strong sense of identity in the Town. Comprehensive development of the Plan area will complete the urban network in the Southeast portion of the Town of Stony Plain. Careful planning of this strategic area will enhance the Town's linkage networks, responding in particular to new opportunities created by development of the Westerra Institute of Technology, the Golf Course and by adjacent new residential subdivisions.

### 1.3 SCOPE

The Southeast Stony Plain Area Structure Plan has been prepared to the level of detail required in the Town of Stony Plain AREA STRUCTURE PLAN POLICY. This policy requires that the Area Structure Plan include the general land use pattern by type, size and location of development, the pedestrian and vehicular transportation networks, the location and size of recreation and education facilities, as well as servicing concepts and development staging. Population projections are calculated in the Area Structure Plan and the growth capacity of existing services in the Town of Stony Plain is discussed in reference to the Plan Area.

#### 1.4 AUTHORIZATION

The Area Structure Plan has been prepared on behalf of the Owner's Group which was formed in May 1982 and consists of the following:

R. and B. Hennig  
The Town of Stony Plain  
Ellesmere Developments Ltd. and Terraventure Investments Ltd.  
Randall C. Wallace Professional Corporation

A representative of this group met with Town Council in December of 1981 and received authorization to prepare this Area Structure Plan. Subsequent, direction for Stanley Associates Engineering Ltd. to proceed with preparation of the Area Structure Plan was received from individual owners during May and June, 1982.

## SECTION 2

### THE SITE

#### 2.1 LOCATION

The Southeast Stony Plain Area Structure Plan site is described as the W½ Section 30 and part E½ Section 25-52-28-W4, and is located on the edge of existing development within the Town's southeast quadrant. Illustrated on Figure I is the strategic location of the site between existing residential development to the northwest, Westerra Institute of Technology to the south, and the Golf Course Subdivision to the north. Development of the Plan area will link these three very important components of the Town's urban network, with a contiguous extension of existing development.

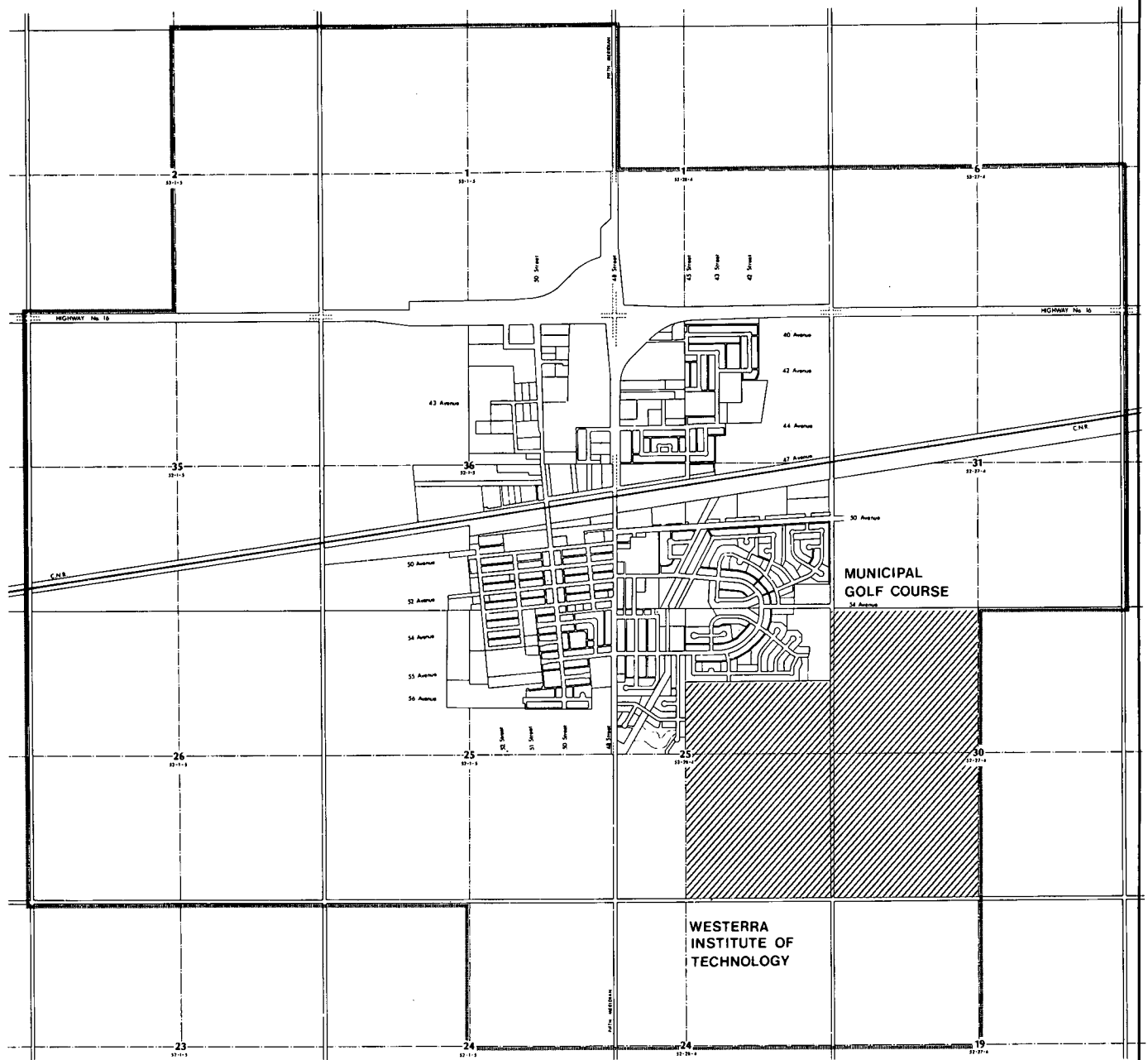
#### 2.2 SIZE

The gross amount of land included in this Area Structure Plan is 225.8 hectares (558.4 acres). The site is bounded by the existing Southridge neighbourhood and the proposed Nu West Golf Course subdivision on the north, by 79th Avenue on the south, by the existing Town boundary on the east and by presently undeveloped land on the west.

#### 2.3 EXISTING LAND USES

As illustrated on Figure 2 the existing land use classification of the proposed Plan area is UR (Urban Reserve) under the Town of Stony Plain Land Use Bylaw No. 715. The area is presently being used for agriculture, a feed lot, and two country residences.

The appropriate reclassification of land within the Plan area will occur subsequent to acceptance of the Area Structure Plan by Bylaw and approval of phased Tentative Plans of Subdivision.

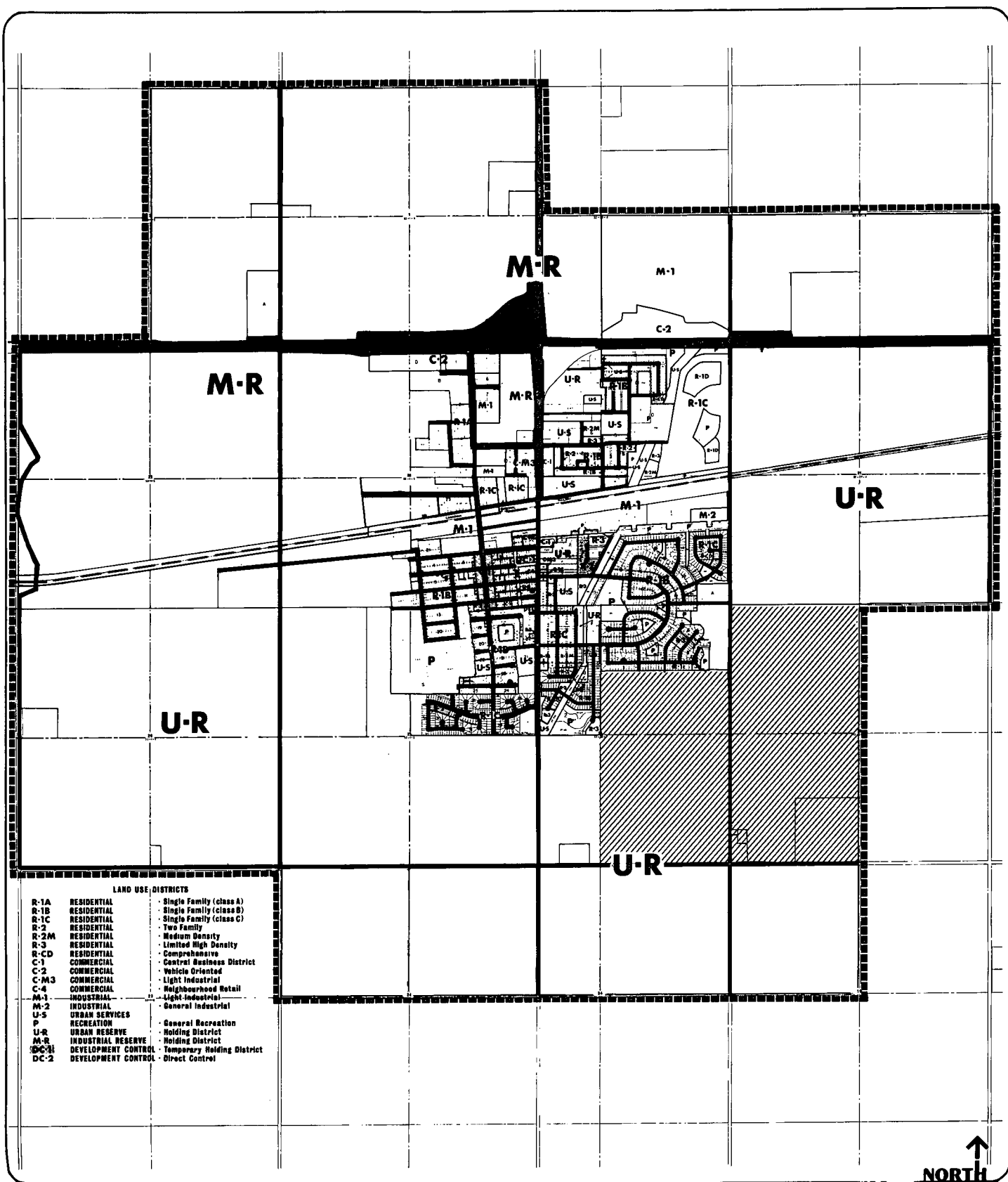


# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

////// SUBJECT AREA

Fig.1

LOCATION PLAN



# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

////// SUBJECT AREA

Fig.2

SURROUNDING LAND USE

## **2.4 SURROUNDING LAND USES**

Existing and proposed land uses on adjacent lands include agriculture, low and medium density urban residential, a major recreational facility and a major institutional facility.

To the south, the site is bound by 79 Avenue with adjacent land uses being agriculture, a cemetery and the site for the Westerra Institute of Technology (NE ¼ Section 24). To the west, adjacent land uses are agriculture and an approved residential subdivision (48 Street) on the NW ¼ Section 25. As several efforts to service this property for residential development have thus far proved unsuccessful, due to a high water table and unstable soil conditions, the actual future use of this parcel is uncertain. However, a portion of this parcel is now being developed for the Pope John II Separate Elementary School. The Southridge subdivision and the proposed Golf Course Subdivision, are found to the north of the Plan site. The Golf Course Subdivision also contains the Stony Plain Municipal Golf Course and Clubhouse. The Plan site is divided by Golf Course Road.

The Plan Area is bounded on the east by the present Town Boundary. Agricultural land uses are found in this adjacent area, which is presently within the County of Parkland and classified as an Agriculture-Mixed Land Use Reserve district. A residential development within the NE ¼ of Section 30 has been proposed by Tri-S Farms/Nu West Development Corporation. This area will require annexation into the Town, if the subdivision is to proceed.

## **2.5 LEGAL DESCRIPTION AND OWNERSHIP**

The Southeast Area Structure Plan area encompasses nine parcels of land as noted in Figure 3 and which are noted below in Table 1, Land Ownership.



TABLE 1  
LAND OWNERSHIP

Part NE ¼ Sec. 25-52-28-W4 32.3 ha (79.91 ac)

- i. C of T 104 I 232 - Registered Owner - R. and B. Hennig

SE ¼ Sec. 25-52-28-W4 64.3 ha (158.97 ac)

Excluding 0.4 hectares (1.03 acres) for road widening as shown on Road Plan 802 067

- ii. C of T 752 103 661 4.0 hectares (9.99 acres)  
Registered Owner - G. and M. McGinn
- iii. C of T 762 038 877 60.3 hectares (148.98 acres)  
Registered Owner - Alberta Housing Corporation  
(The Town of Stony Plain has first right of refusal on this property)

NW ¼ Sec. 30-52-27-W4 64.7 ha (160.00 ac)

- iv. C of T 103 I 232 - Registered Owner - R. Hennig

SW ¼ Sec. 30-52-27-W4 64.5 ha (159.48 ac)

Excluding 0.2 hectares (0.51 acres) for road widening as shown on Road Plan 802 067

- v. C of T 802 170 612 46.5 hectares (115.00 acres)  
Registered Owner - Ellesmere Developments Ltd. and  
Terraventure Investments Ltd.
- vi. C of T 161-x-270 16.0 hectares (39.48 acres)  
Registered Owner as indicated under an agreement for  
sale which is the subject of Caveat No. 792 193 721  
- Geoffrey Ho and Douglas Rae; Elder-Wal Registrations  
Ltd. and Douglas C. Wallace Professional Corporation.
- vii. 0.1 hectares (0.29 acres) For road as shown on Plan 782 1916
- viii. C of T 792 063 838 1.4 hectares (3.45 acres)  
Lot 2 Plan 782 1916  
Registered Owner - Town of Stony Plain
- ix. C of T 782 247 59 0.5 hectares (1.26 acres)  
Lot 1 Plan 782 1916  
Registered Owner - S.V. and M.A. Kennedy

TOTAL SITE

225.8 ha (558.4 ac)

## **2.6 EASEMENTS, CAVEATS AND COVENANTS**

The Plan area is subject to a number of easements, rights-of-way and conditions relevant to future development which are noted below in Table 2 - Easements, Caveats and Covenants. The location of easements and rights of way are noted in Figure 3.

**TABLE 2**  
**EASEMENTS, CAVEATS AND COVENANTS**

**Pt. NE ¼ Sec. 25.52.28.W4**

- i) Restrictive covenant No. 5934 UO 1974 by R. and B. Hennig governing the type of buildings which may be erected in the future.

**SE ¼ Sec. 25.52.28.W4**

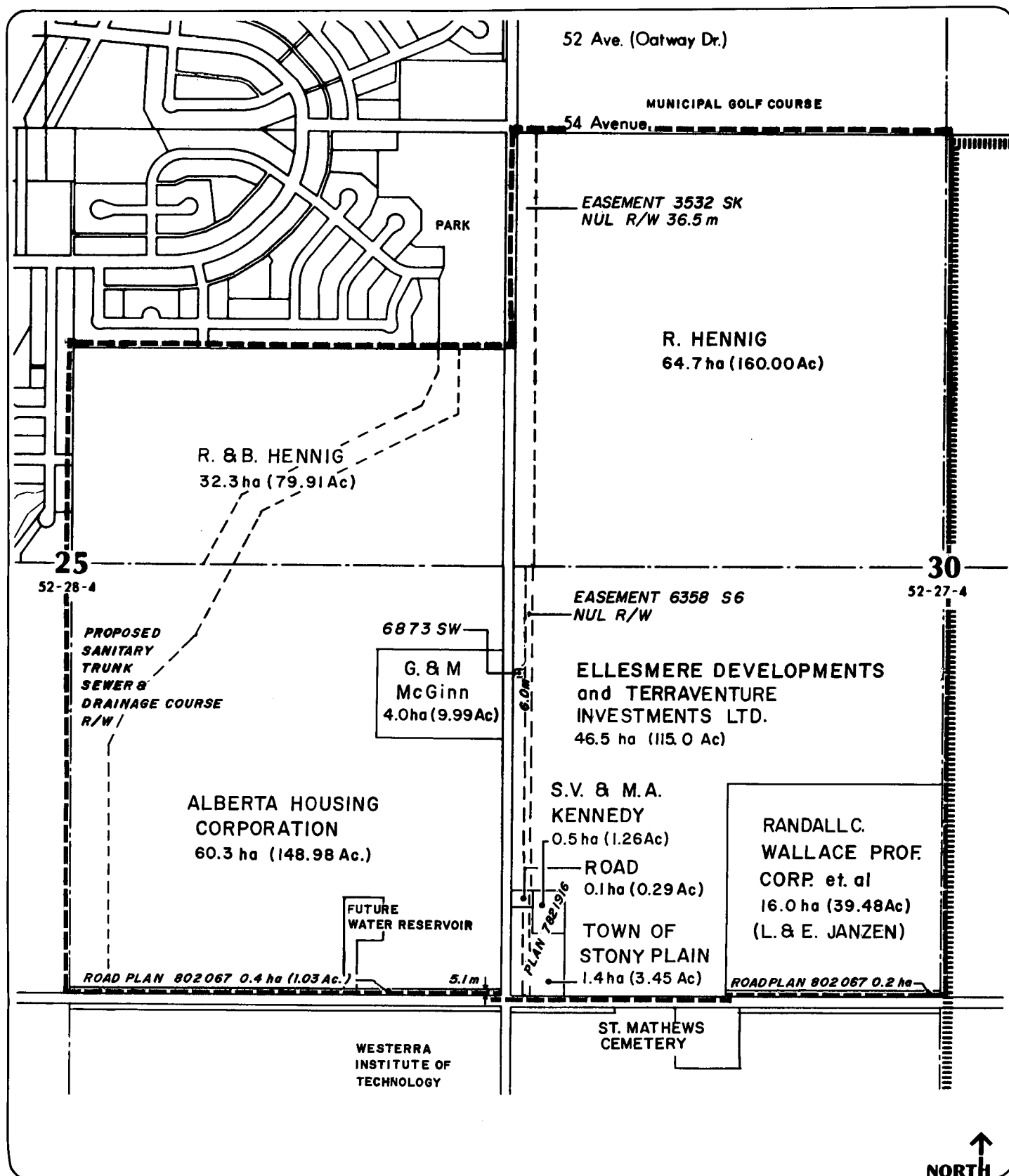
- ii) Deferred Reserve Caveat No. 752 036 521 for 6.5 hectares (16.0 acres), Edmonton Regional Planning Commission.

**NW ¼ Sec. 30.52.27.W4**

- iii) Deferred Reserve Caveat No. 752 091 204 for 6.4 hectares (15.8 acres), Edmonton Regional Planning Commission
- iv) Easement No. 3532 SK - 1971  
To Northwestern Utilities Ltd. for a gas line R/W.

**SW ¼ Sec. 30.52.27.W4**

- v) Deferred Reserve Caveat No. 782 149 149 for 4.9 hectares (12.1 acres), Edmonton Regional Planning Commission
- vii) Caveat No. 782 069 846 - 1978 by the County of Parkland for a future road widening (79 Avenue)
- viii) Caveat No. 793 193 721 - 1979 Agreement for sale listing as purchasers Geoffrey Ho and Douglas Rae; Elder-Wal Registrations Ltd. and Randall C. Wallace Professional Corporation from L. and E. Jansen a portion of SW ¼ Sec. 30.52.27.W4 as described in C. of T. 161-x-270
- ix) Easement No. 6873 SW - 1972 To Northwestern Utilities Ltd. for a gas line R/W.
- x) Caveat No. 782 056 619 - 1978 By the Town of Stony Plain for the purpose of governing the subdivision of plan 782 1916 and future ownership of its lots. Also contains a covenant referring to the road registered in plan 782 1916.



# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN


 BOUNDARY OF SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN  
CONTAINING 228.4 ha (564.36 Ac)

Fig. 3

### SECTION 3

#### DEVELOPMENT OBJECTIVES

The existing Stony Plain GENERAL MUNICIPAL PLAN (GMP) provides the overall policy framework for development of new areas within the Town of Stony Plain. The development objectives for the Southeast Area Structure Plan noted in this section are based on the GMP Policy framework.

Future long term transportation concepts for the Town are in part found in the Spruce Grove - Stony Plain Corridor Study (November 1981). Additional development objectives for the Town's future servicing and transportation network were formulated by Stanley Associates Engineering Ltd. in the Town of Stony Plain Transportation and Utility System Study (December 1980). The Transportation and Utility System Study has been used in determining servicing objectives and general transportation objectives for this Area Structure Plan. Relevant amendments to these existing transportation policies have been developed as part of the new General Municipal Plan project, and are reflected in this Area Structure Plan where appropriate.

Additional objectives for land use, servicing, transportation and the open space system were defined in preliminary discussions with the Stony Plain administration, representatives of the Owners Group, Alberta Environment, Alberta Transportation, and the Edmonton Metropolitan Regional Planning Commission.

#### DEVELOPMENT OBJECTIVES

##### **(A) Provide Additional Land Use For Residential Development:**

- i) in order to accommodate Westerra students;
- ii) in order to accommodate Westerra staff;

- iii) in order to meet the 8 percent growth rate and maintain a 20 year residential land supply as stated in the existing GMP.

**(B) Provide Land For Non-Residential Uses Under The Following Circumstances:**

- i) Neighbourhood convenience commercial will be located to support the principle of self-sufficiency of residential neighbourhoods.
- ii) Locate required institutional land use so that such activity does not detract from the private, livable nature of residential neighbourhoods.

**(C) Support An Economical And Efficient Urban Development Pattern:**

- i) Determine the limit of economical development for both standard development and innovative development techniques using both the criteria established in Stony Plain Transportation and Utility System Study as well as geotechnical data;
- ii) Propose economical means for developing the area through efficient street and servicing patterns;
- iii) Ensure that commercial activities are accessible to the populations that they are to serve;
- iv) Locate community services in proximity to the residents they are to serve.

**(D) Establish Appropriate Land Uses And Densities Which Satisfy Market Requirements, Resident Needs And Which Are Compatible With Adjacent Areas:**

- i) Medium and high density residential will be located close to major facilities such as the institutional sites, amenity areas and recreation features, and peripheral arterials;

- ii) Future development will constitute an orderly extension of the existing urban structure and will serve to integrate the Institute of Technology site, the downtown core, the Golf Course, new adjacent subdivisions and the existing Townsite within a comprehensively planned urban network. Urban linkages (roads, transit and open space system) and land use patterns will reflect this goal.

**(E) Encourage Livable Residential Environments And Promote High Standards Of Safety, Convenience, Privacy And Amenity In All Residential Neighbourhoods:**

- i) Create a collector roadway pattern directly oriented to defined residential neighbourhoods, and which minimizes external traffic movement through these areas.
- ii) Provide an overall housing ratio of approximately 60/40 single family detached to multi-family housing as a reflection of the demand for rental accommodations created by the adjacent Westerra Institute.
- iii) Provide the following variety of housing types, dwelling lot sizes and types of tenure to satisfy market demand:
  - o rental student housing - multi-family - close proximity to Institute
  - o multi-family - family rental units
  - o multi-family - condominiums or co-ops
  - o single-family - small lot subdivision
  - o single-family - conventional
  - o mixed use residential/commercial in close proximity to the Institute site
- iv) Provide adequate on-site parking and recreational areas in multi-family developments.
- v) Establish an orderly and economic staging program to minimize servicing costs.

- vi) Create subdivision plans which enhance the appearance of neighbourhoods and result in an economical use of land.
  - vii) Locate major concentrations of residents in proximity to land uses associated with day-to-day activities such as schools, recreation and commercial facilities and to major community facilities, transportation routes or significant natural amenities.
  - viii) Encourage street landscaping based on Town guidelines.
  - ix) Maximize potential amenity benefits of natural topographic features such as those associated with Streamcourse No. 3 and Atim Creek.
  - x) Develop guidelines including architectural controls to enhance the appearance of neighbourhoods while allowing for variety and individual identity.
- (F) Unify Adjacent Neighbourhoods With A Continuous Pedestrian Walkway System Associated With Drainage Courses, Sidewalks, Natural Areas, And Formal Open Spaces.**

## SECTION 4

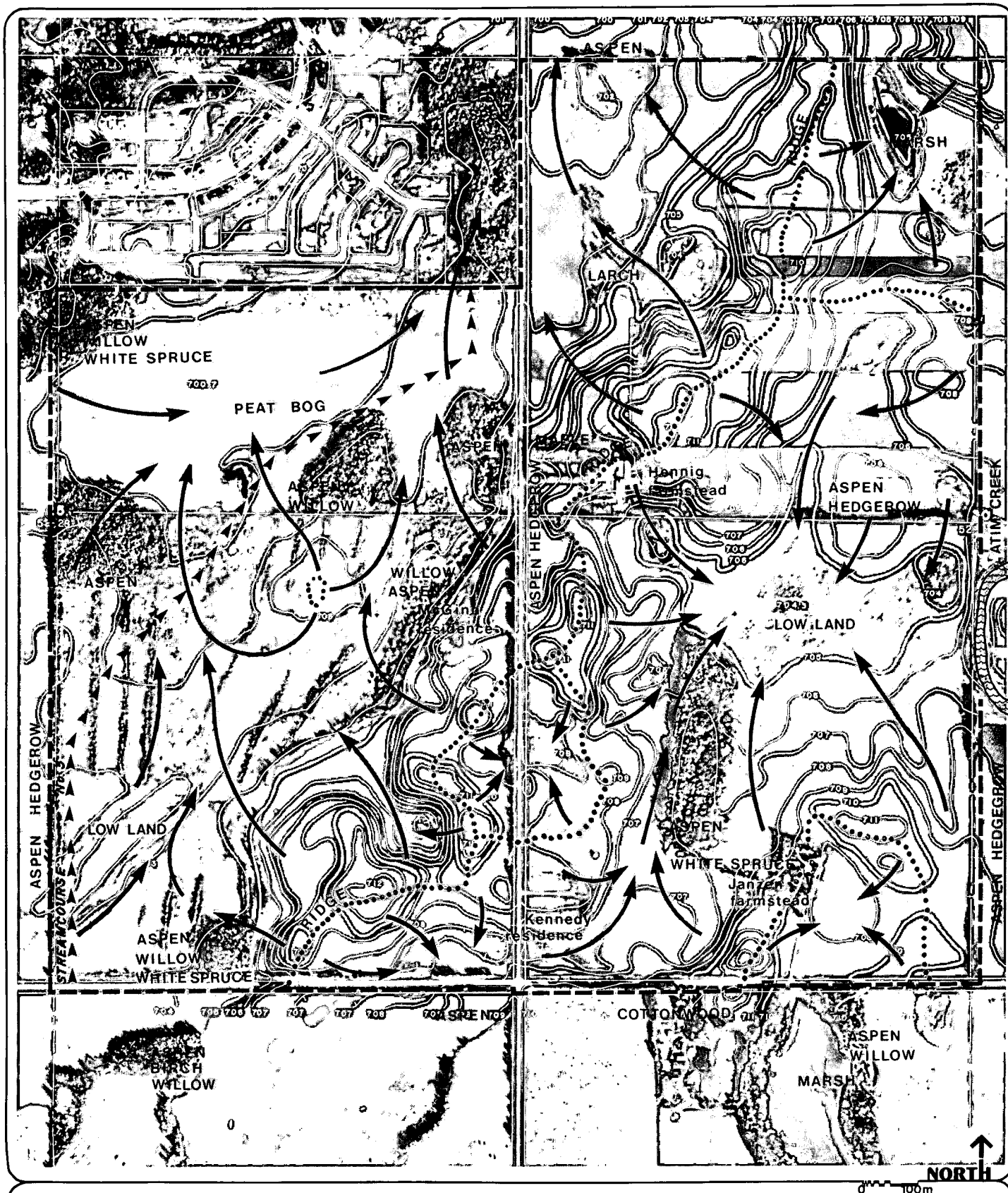
### DEVELOPMENT PARAMETERS

#### 4.1 TOPOGRAPHY AND SURFACE DRAINAGE

The topography and general drainage patterns for the Plan area are illustrated on Figure 4. The Plan site is composed of two distinct types of terrain which are common to the Stony Plain area. The majority of the site, over 75 percent, is characterized by terrain with an undulating topography and considerable relief. This area includes a major ridge, running from southwest to northeast which divides the entire Plan site into two drainage areas. Drainage is generally good in this terrain with pockets of wet or poorly drained land, including a prominent lowland area in the SW ¼ Section 30. Lands east of the ridgeline as illustrated on Figure 4 drain into this lowland, discharging directly into Atim Creek which is the major drainage course for much of the area south and east of Stony Plain. All the land to the west of the ridgeline drain into the lowlands in the E ½ of Section 25, and eventually flows into Atim Creek at Highway 16 via Streamcourse Number 3.

Roughly 50 hectares (123.5 acres) of land in the western portion of the Plan site is presently occupied by lowland terrain. There is less than two metres of relief over this portion of the site which is generally marshy with a high water table and very poor drainage. However, Streamcourse No. 3 is a natural drainage course which runs from southwest to northeast through this lowland portion of the site, discharging eventually into Atim Creek at Highway 16. Until very recently the alignment of Streamcourse No. 3 was undefined within the development area, occupying most of the lowland area. Construction of an artificial course to improve drainage through the lowland area in the SE ¼ Section 25 and part of the NE ¼ Section 25 is now complete, clearly defining the Streamcourse No. 3 alignment which is illustrated on Figure 4. This streamcourse improvement is expected to facilitate better surface drainage in the western portion of the site, and thereby create improved development potential.





# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

## SURFACE DRAINAGE PATTERN

- ..... Watershed Divide (micro scale)
- Direction Of Flow

CONTOUR INTERVAL 10.m Geodetic Datum

Fig. 4

TOPOGRAPHY, SURFACE DRAINAGE AND VEGETATION

## 4.2 VEGETATION

Approximately two-thirds of the Plan area is under cultivation for the production of cereal grains, as illustrated on Figure 4. Within this cultivated portion of the site, several hedgerows, shelterbelts and one large woodlot are found. The predominant species are aspens with lesser amounts of intermixed white spruce, manitoba maple, willow and larch.

The lowlands in the E½ of Section 25 have been partially cleared. However, significant areas of aspen, willow and white spruce bluffs do remain in the corners and along the edges. An aspen hedgerow marks the boundary of this area on the west and east.

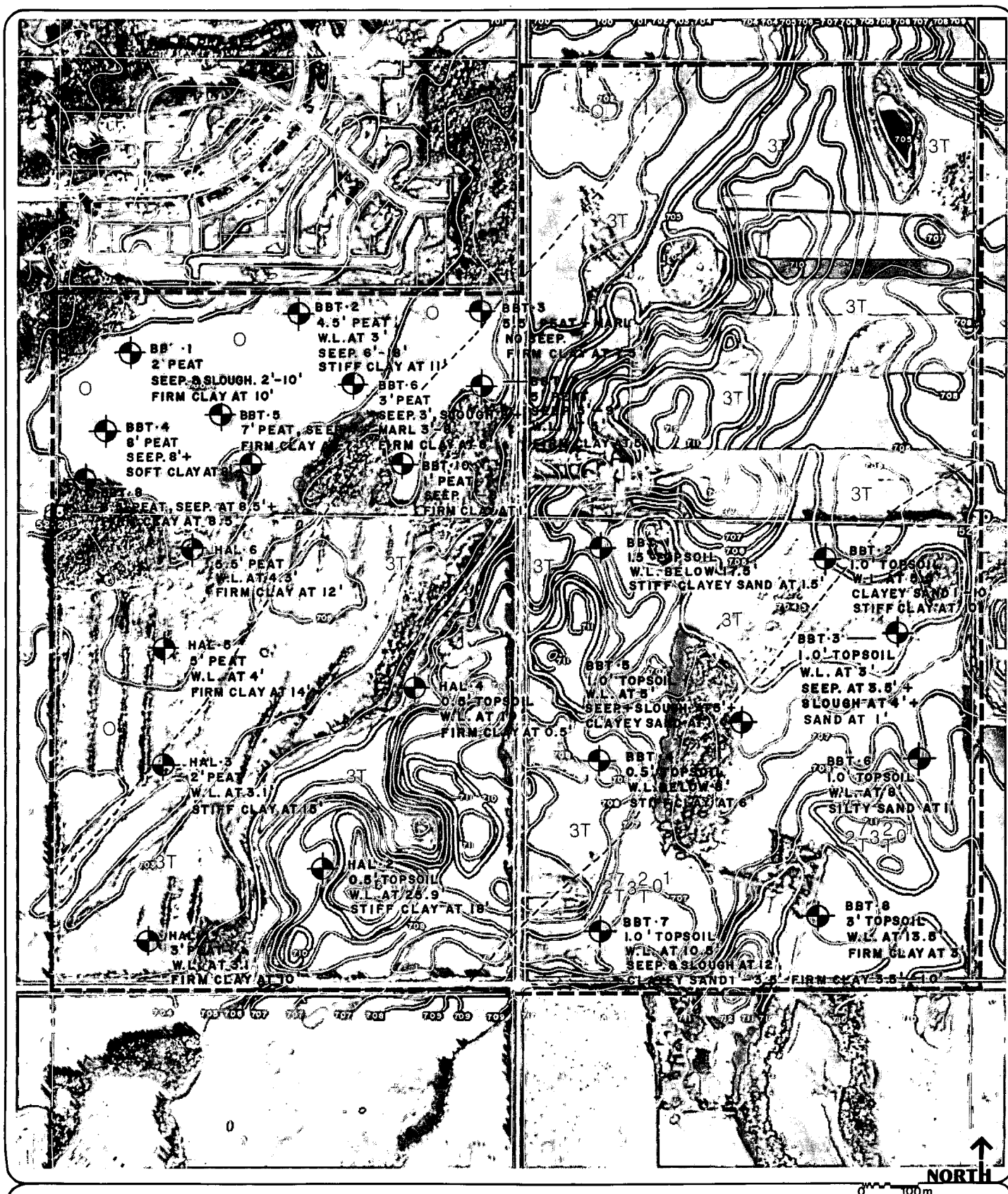
This combination of hedgerows and poplar bluffs associated with lowlands is characteristic of the Stony Plain area. Although without much economic value, these small tree stands do form the main visual element in the surrounding landscape.

## 4.3 SOIL CLASSIFICATION

The Canadian Land Inventory - Capability for Agriculture indicates soil classifications for the Plan area, which are illustrated on Figure 5. More than 80 percent of the site is classified as soil types 2 and 3 indicating moderate limitations to agriculture due to terrain. The remainder of the site, roughly corresponding to the lowland areas of the site, are classified as type O -organic soils.

## 4.4 SUB-SURFACE GEOLOGY

Geological mapping by the Alberta Research Council indicates the predominant subsoils in the Plan area are glacial lake bed deposits consisting of bedded sand, silt and some clay underlain by minor till and cretaceous sandstone bedrock of the Wapiti Formation.



## SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

TEST HOLE DATA FROM BBT ENGINEERING (1978, 1980) AND R.M. HARDY & ASSOCIATES LTD. (1976)

Abbreviations: seepage—seep, sloughing—slough, water level—w.l.  
SOIL CLASSIFICATIONS ARE FROM THE CANADIAN LAND INVENTORY—CAPABILITY FOR AGRICULTURE 2T, 3T = moderate limitations (terrain) 0 = organics

Fig. 5

## SUBSURFACE GEOLOGY AND SOIL CLASSIFICATION

Preliminary geotechnical analysis has been carried out on all Plan areas except the NW ¼ of Section 30. A summary of the test hole data obtained during investigations by BBT Engineering and R.M. Hardy and Associates is noted on Figure 5.

The 1976 R.M. Hardy and Associates Ltd. testing of the SE ¼ of Section 25 shows that 0.15 to 1.7 metre (2.0 to 5.5 feet) of peat is found on the Streamcourse No. 3 lowlands, with organic silts and silty soft clay down to 7.9 metres (26 feet). Such results suggest that these lowlands may present severe limitations to development. Somewhat better conditions are possible above the 702 metre contour where a maximum of 0.6 metres (2 feet.) of peat was encountered. Fair to good conditions are available above the 703 - 704 metre elevation, where a thin layer of topsoil covers firm clay and silt. High water levels were recorded at elevations below 703 metres indicating that dewatering may be required preceding construction in areas below this elevation. The recent completion of the new drainage improvements for Streamcourse No. 3 should have a positive effect on water levels in the immediate area.

The 1978 BBT Geotechnical Consultants Ltd. analysis of the southern portion of the NE ¼ of Section 25 shows that up to 2.6 metres (8.5 feet.) of peat is found on site, underlain by soft, silty clay. This poor condition represents roughly 65 percent of the parcel, below the 701 metre elevation. As the land rises to the east, the depth of peat is reduced, although still relatively deep. With less peat cover and firmer clay/silt base, land between the 701 and 702 metre contour can be described as fair to poor, representing roughly 25 percent of the parcel. The remaining 10 percent, in the southeast portion of the parcel above the 702 metre contour, is fair to good for development. High water levels were recorded in areas below the 702 metre elevation.

The SW ¼ of Section 30 was investigated in 1980 by BBT Engineering for Ellesmere Developments Ltd. Test holes below the 706 metre contour showed topsoil underlain with silty, moist sand. BBT classified roughly 25 to 30 percent of the parcel, mainly below the 706 metre contour, as having potential limitations for development. The fair/poor areas below the 707 metre contour covers roughly 25 percent of the parcel, with test holes showing a firmer clay and sand base. The remainder of the parcel is classified as fair to good. These lands are generally above the 707 metre contour, with

a stiff clay base. Some high water levels were recorded in areas below the 707 metre contour which were directly adjacent to the lowlands which drains into Atim Creek.

No geotechnical analysis has been conducted on the NW ¼ of Section 30. However an extrapolation of data on the SW ¼ of Section 30, air photo information, and the extent of existing cultivation suggests that approximately 75 percent of the quarter is of the fair to good for development category. The remainder, below the 705 metre contour, may be fair to poor owing to the proximity of the Streamcourse No. 3 lowlands in this area.

This preliminary rating of general site developability is based exclusively on a review of geotechnical information compiled for all site parcels except the NW ¼ of Section 30. The information is acknowledged as preliminary in nature by the involved geotechnical consultants. The resulting site delineations noted in Table 3 are felt to be acceptable for Area Structure Plan purposes, and have been augmented with additional air photo and on-site investigation as part of this Area Structure Plan project. However, the developability ratings must be expanded into more detailed information through future investigation prior to detailed subdivision design and construction. The preliminary ratings must not be construed as definite guidelines for future subdivision purposes.

#### 4.5 DEVELOPMENT POTENTIAL

Potential constraints to urban development in the Plan area may be due to several conditions including extensive deposits of cohesionless soils such as silt or marl, peat deposits, and the high water levels and poor drainage which are associated with low lying areas of relatively flat terrain. While it is doubtful whether there are any areas which are completely undevelopable, the high development costs to be encountered in some areas may make them only marginally suited for development. This is especially true in large wet areas and in areas where a combination of problematic conditions must be overcome. In addition, it is very important to consider the intensity and extent of development which is proposed when determining the development potential of an area. Some land uses are much less sensitive to site conditions than

others. For example, an area with relatively severe development restraints could be very feasible for the economic development of educational facilities because only a small proportion of the site will be affected by the construction of buildings or underground services and because foundation requirements for modern schools do not include basements. High density residential land uses are also less sensitive to physical constraints because the greater economic return per acre allows a substantial investment in services and because shared services, more substantial foundations and a larger scale of construction reduce the cost of overcoming restraining conditions. Economical development of low density residential land is however, most sensitive to physical constraints.

In preparing a preliminary classification system of overall development potential for the Plan site, the suitability for low density residential development was used. Since low density residential construction and servicing is the most sensitive type of development in terms of physical constraints, it is considered that categories suitable for this type of development will encompass and include other proposed land uses as well. The general developability rating on the entire Plan site as illustrated on Figure 6 can be summarized as follows:

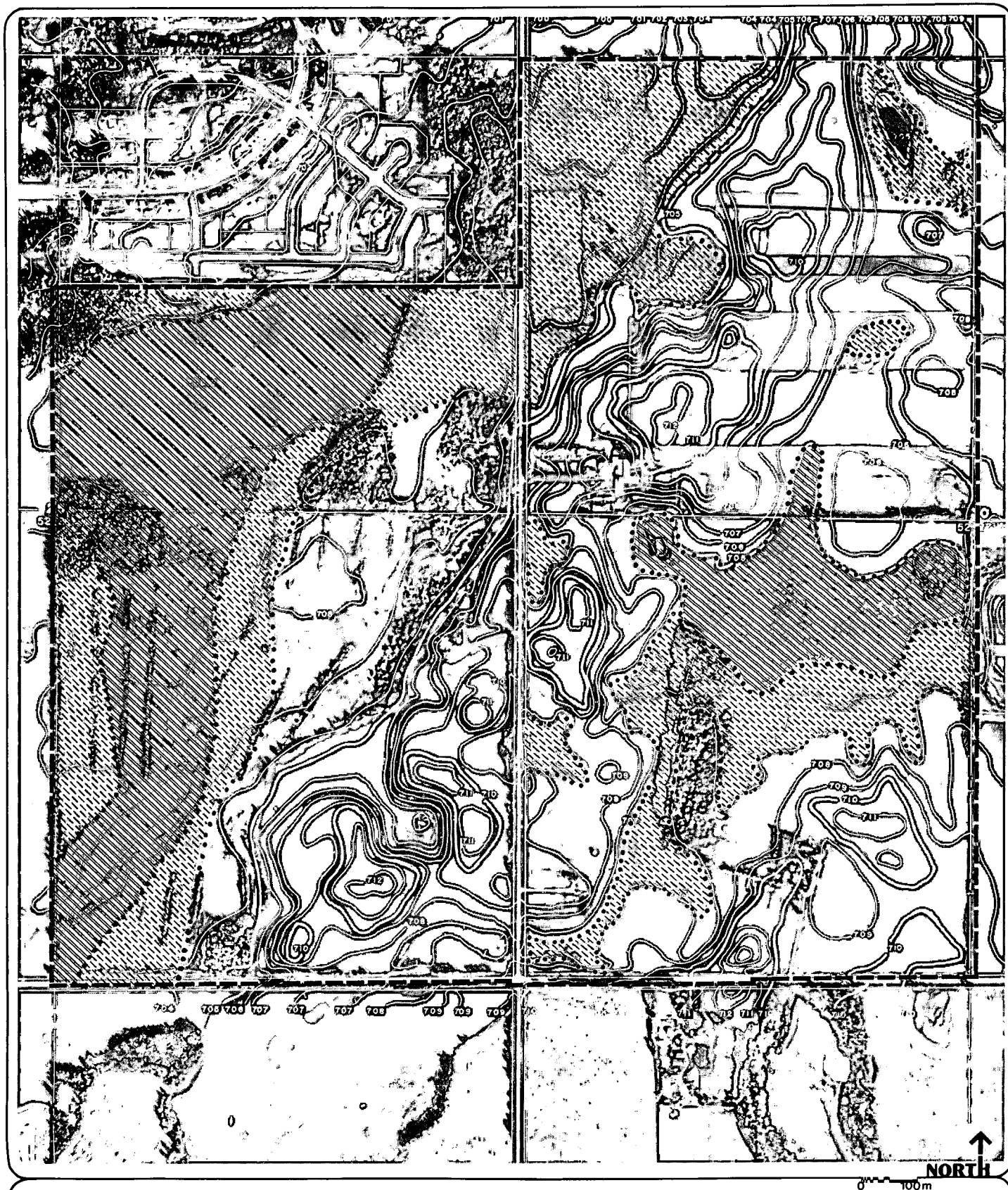
**TABLE 3**  
**DEVELOPMENT POTENTIAL**

<u>Class</u>	<u>Area Hectares</u>	<u>Area (Acres)</u>	<u>% of Total Site</u>
Poor	36.0	(90)	16
Fair/Poor	69.0	(170)	30
Fair/Good	<u>121.0</u>	<u>(300)</u>	<u>54</u>
<b>TOTAL</b>	<b>226.0</b>	<b>(560)</b>	<b>100</b>




**Note:**

These preliminary site developability ratings are based exclusively on available introductory geotechnical information compiled for all site parcels except the NW ¼ Section 30. This information is acceptable for Area Structure Plan purposes, but must be refined through further geotechnical studies throughout





# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

-  POOR
-  FAIR-POOR
-  FAIR-GOOD

Note: Preliminary only. Does not reflect detailed geotechnical analysis.

Fig. 6

DEVELOPMENT POTENTIAL

the subdivision phases of the project. Since further analysis may alter the development potential ratings, the figures in Table 3 must not be used as definite limitations to site development.

Based on this preliminary assessment, the Area Structure Plan land use distribution should be oriented to low intensity land uses, such as single family housing, on the fair to good lands. Higher density housing and some degree of open space should be located on fair to poor lands, except along Streamcourse No. 3 where a prominent wet area is currently located. The poor areas of the site may be left in a natural state, or improved for open space and recreational purposes. The extent of this limitation on poor soils must be finalized through detailed geotechnical analysis and service costing as part of eventual subdivision planning.



## SECTION 5

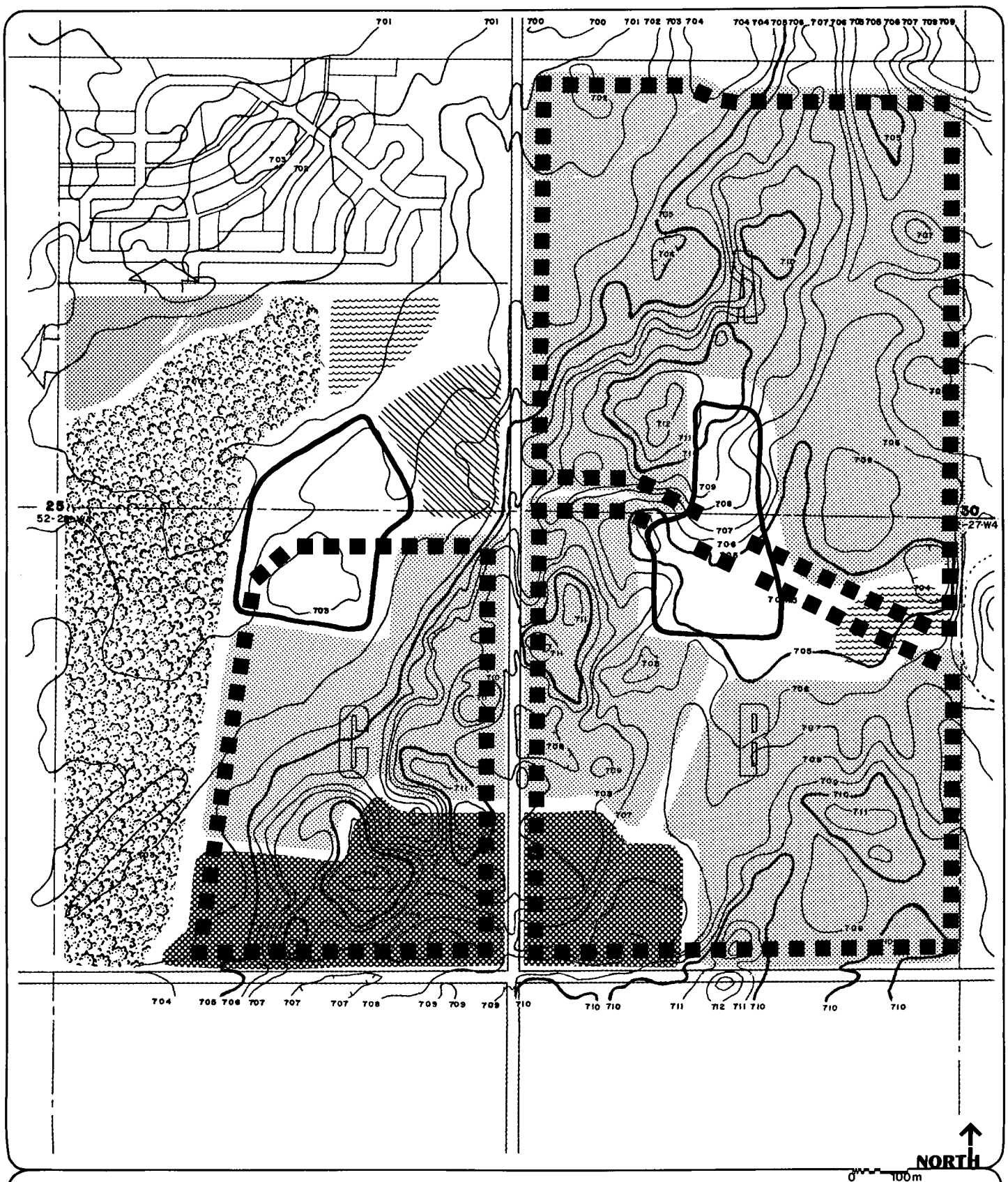
### DEVELOPMENT CONCEPT

#### 5.1 AREA STRUCTURE PLAN DESIGN THEMES

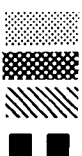
The Southeast Stony Plain Area Structure Plan Development Concept illustrated on Figure 7 is based on the design themes noted below. These themes are intended to translate the development objectives noted in Section 3, into the physical design of the Plan.

- i) To create a unique identity for the Plan area on both a community and neighbourhood level. Identity within the Stony Plain community is to be created through placement of an urban node adjacent to the Westerra Institute of Technology. Placement in the urban node of a potential hospital site, and a large portion of the Plan's medium and high density residential development, will reflect the urban character of the Institute and create an area along 79 Avenue which is distinctive, and which will become an important component in the urban network within Stony Plain.

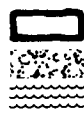
Neighbourhood identity has been created by separating the low density residential development into three neighbourhoods, roughly the size required to generate sufficient students to support an elementary school. This physical separation between neighbourhoods has been created by the placement of schools, drainage parkways and storm retention ponds. Neighbourhood identity has also been reinforced by having the collector loops contained within each neighbourhood and not inter-connecting each neighbourhood. This transportation scheme will maintain the local character of each neighbourhood as noted in Objective E(i) of Section 3, by linking vehicular transportation patterns to each neighbourhood configuration.



# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN



RESIDENTIAL NEIGHBOURHOOD  
 URBAN NODE  
 PRIVATE INSTITUTION  
 NEIGHBOURHOOD



SCHOOL SITE  
 NATURAL AREA  
 STORM POND

Fig.7

DEVELOPMENT CONCEPT

- ii) A cellular concept will be utilized to subdivide the neighbourhoods into sub-neighbourhood units. This configuration will reduce local traffic flows, and create socially identifiable sub-neighbourhood units which will encourage local resident interaction. The cellular concept will also facilitate orderly and flexible development staging.
- iii) Neighbourhood level services such as schools, passive recreation facilities and convenience shopping will be provided adjacent to the residential neighbourhoods. Neighbourhood level convenience stores will be provided to specifically serve neighbourhood residents.

## 5.2 LAND USE DISTRIBUTION

Table 4 identifies the proposed land use for the Southeast Stony Plain Area Structure Plan as illustrated on Figure 8.



**TABLE 4**  
**LAND USE DISTRIBUTION\***

Land Use	Area Hectares	(Acres)	Percent of GDA (%)
<b>RESIDENTIAL</b>			
Single Family	82.0	(203.0)	47.4
Medium Density**	15.0	(37.0)	8.7
High Density	7.5	(18.5)	4.3
<b>Subtotal</b>	<b>104.5</b>	<b>(258.5)</b>	<b>60.4</b>
<b>COMMERCIAL</b>			
Neighbourhood	1.0	(2.5)	0.6
<b>PARK/SCHOOL DEDICATION (MR &amp; MSR)</b>	<b>17.5</b>	<b>(43.0)</b>	<b>10.0</b>
<b>CIRCULATION</b>			
Arterial Roads and Widenings	5.5	(13.5)	3.2
Internal Roads	32.0	(79.0)	18.5
<b>Subtotal</b>	<b>37.5</b>	<b>(92.5)</b>	<b>21.7</b>
<b>INSTITUTIONAL</b>			
Private Institution	6.0	(15.0)	3.5
Churches	0.5	(1.0)	0.3
Hospital	6.0	(15.0)	3.5
<b>Subtotal</b>	<b>12.5</b>	<b>(31.0)</b>	<b>7.3</b>
<b>GROSS DEVELOPABLE AREA (GDA)</b>	<b>173.0</b>	<b>(427.0)</b>	<b>100</b>
<b>PUBLIC UTILITY LOTS (PUL)***</b>	<b>18.0</b>	<b>(45.0)</b>	
<b>NATURAL AREA</b>	<b>35.0</b>	<b>(87.0)</b>	
<b>TOTAL PLAN AREA</b>	<b>226.0</b>	<b>(560.0)</b>	

\* Rounding has occurred.

Notes:

\*\* Medium density residential includes the Land Use Categories of R-2 and R-2M.

\*\*\* PUL includes Stormwater Detention Pond, Water Reservoir, Drainage Parkway and Walkways.

### 5.3 POPULATION AND RESIDENTIAL UNITS

Noted in Table 5 are the population and residential unit generation statistics for the plan area.

TABLE 5

#### POPULATION AND RESIDENTIAL UNIT GENERATION

	Net Units/Hectare	Net Units/Acre	Number of Units	Percent of Total Units (%)	Persons/ Unit	Persons
Single Family	22.85*	9.25*	1875	60	3.3	6190
Medium Density	39.5	16.00	590	20	2.0	1180
High Density	79.0	32.00	590	20	1.5	885
<b>TOTAL</b>			<b>3055</b>	<b>100</b>		<b>8255</b>

Rounding has occurred.

\* Unit density for Single Family housing is based on a mix of R-1B 25%, R-1C 50% , and R-1D 25% and follows lot size standards in the Land Use Bylaw, resulting in an average lot size of 437.5 square metres/lot (4710 square feet/lot).

Table 6 offers the population and resident unit density statistics for the Plan area. Statistics have been denoted in terms of the Gross Developable Area (173.0 ha).

TABLE 6

#### POPULATION AND RESIDENTIAL UNIT DENSITY

	Population Density		Residential Unit Density	
	Persons/hectare	Persons/acre	Units/hectare	Units/acre
Gross Developable Area	47.7	19.3	17.6	7.2

Rounding has occurred.

The statistics noted in Table 6 indicate that the population density based on the Gross Developable Area is 47.7 persons/hectare (19.3 persons/acre) which exceeds the density guideline of 39.5 persons/hectare (16 persons/acre) set forth under the current GMP. This increase in density is justified for this particular Plan site for the reasons noted below:

- i) Since the GMP was prepared in 1978 there has been a significant change in both the housing markets and the role of Stony Plain within the greater Edmonton region. The existing GMP does not reflect these changes. The traditional role of Stony Plain as an agricultural service centre is changing with the additional role of an urban satellite community. Events in Stony Plain since the GMP was prepared in 1979 such as those noted below, are indicators of the Town's changing role:
  - a) the annexation of lands
  - b) the choice of Stony Plain as the location of the Westerra Institute of Technology; and
  - c) the designation of Stony Plain by the EMRPC as a industrial growth centre.

As Stony Plain becomes increasingly urbanized as a result of this change, regional housing market forces will become increasingly important in the provision of housing. A major national trend which has impacted on housing in most Alberta communities is the trend toward smaller residential lots. The Town of Stony Plain initiated the process of acknowledging this trend in 1981 when Council adopted an addition to the Land Use Bylaw of a R-1D narrow lot category. However without an increase in overall residential density, narrow lot housing is impractical to develop to any appreciable degree since the increased density for this portion of a Plan area would have to be compensated for by lower density, larger lot residential development elsewhere the Plan area. Today's housing market cannot absorb a significant proportion of large lot houses. Therefore, an increase in overall area density is required in order to properly implement these new housing trends.

- ii) The Town is currently involved in the preparation of an updated GMP. This new research and policy development will better reflect new Town attitudes regarding density standards.
- iii) The major catalyst for preparation of this Plan is Westerra Institute of Technology. This educational facility is expected to have 3500 full time equivalent students when complete. In order to accommodate the expected demand for rental accommodation created by this student population, the Plan provides for a higher percentage of medium and high density residential development than would otherwise be the case. In combination, medium and high density residential housing represents 44 percent of the total housing within the Plan area. This percentage has increased the overall density of the Plan area.

#### 5.4 STUDENT GENERATION AND SCHOOLS

The expected student generation factors by housing type for the Plan area are noted in Table 7. These generation factors are estimates only, reflecting average situations in communities within the Edmonton sub-region.

TABLE 7

#### STUDENT GENERATION FACTOR PER HOUSEHOLD

<u>Housing Type</u>	<u>Elementary</u>	<u>Junior High</u>	<u>Senior High</u>
Single Family	.54	.27	.30
Medium Density	.15	.08	.05
High Density	.05	.05	.05

Based on Table 7 - Student Generation Factor Per Household, and Table 5 - Population and Residential Unit Generation, the expected student population for the Plan area is noted below in Table 8.



**TABLE 8**

**STUDENT POPULATION GENERATION**

<u>Housing Type</u>	<u>Elementary</u>	<u>Junior High</u>	<u>Senior High</u>
Single Family	1010	505	560
Medium Density	90	50	30
High Density	<u>30</u>	<u>30</u>	<u>30</u>
<b>TOTAL</b>	<b>1130</b>	<b>585</b>	<b>620</b>

Rounding has occurred.

By using the Alberta Education mean class size of 25 full time equivalent students for all grades, the number of classroom required by the student population to be generated by the Plan area is noted in Table 9.

**TABLE 9**

**SCHOOL CLASSROOM GENERATION**

<u>Housing Type</u>	<u>Elementary</u>	<u>Junior High</u>	<u>Senior High</u>
Single Family	40.0	20	23
Medium Density	3.5	2	1
High Density	<u>1.0</u>	<u>1</u>	<u>1</u>
<b>TOTAL</b>	<b>44.5</b>	<b>23</b>	<b>25</b>

To facilitate the number of classrooms required to accommodate this student and classroom generation within the Plan area, provision has been made in the Plan for 3 elementary schools, 1 Junior High School and 1 Senior High School.

## **5.5 PEDESTRIAN CIRCULATION AND OPEN SPACE SYSTEM**

The pedestrian circulation network and open space system illustrated on Figure 9, facilitates easy access to the schools as well as forming a component of the community open space system in Stony Plain as noted in the **Town of Stony Plain Recreation Master Plan**. A main linkage will be provided from the Westerra Institute of Technology to the future open space along Atim Creek, and to the Golf Course.

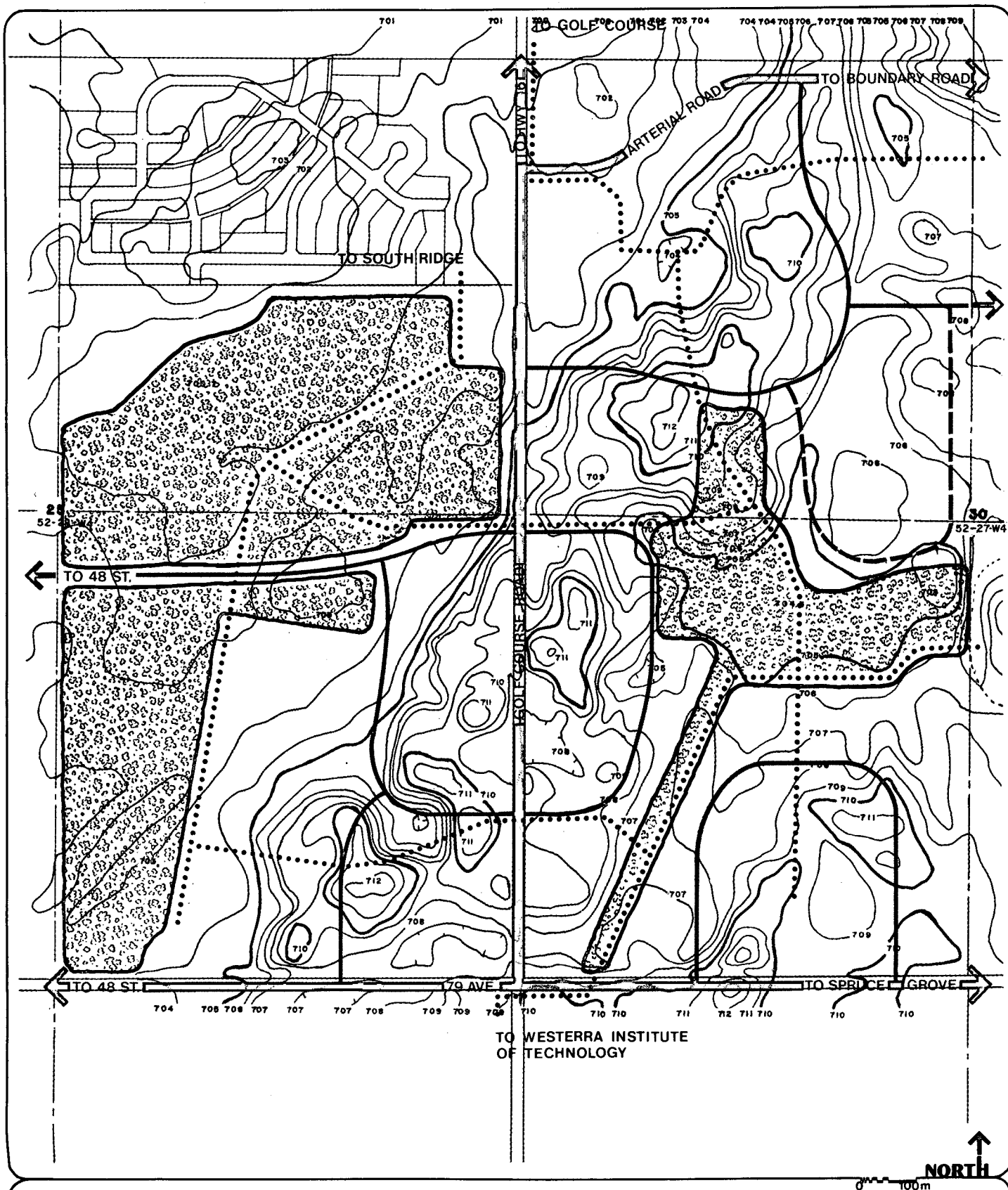
These pedestrian linkages will utilize the drainage parkway, school sites and walkways. Pedestrian access to the school sites will be accommodated by the local street pattern, with walkways being provided at strategic locations.

The active recreation facilities within the Plan area will be developed as an integral component of the school sites. The potential natural area to the west may be appropriate as a passive recreation area if detailed geotechnical analysis indicates poor or costly opportunities for more intensive residential development. Walkways and cross-country ski trails would be compatible uses with a passive recreation area.

## **5.6 VEHICULAR CIRCULATION AND PUBLIC TRANSPORTATION**

The vehicular circulation network as illustrated on Figure 10 is based on the concept presented in the **Town of Stony Plain Transportation and Utility System Study**. An additional east-west collector road has been added to the concept as a result of community input into the new General Municipal Plan requesting more east-west linkages in the Town.

The roadway network will have three types of roads in the transportation hierarchy; arterials, collectors, and local streets. The arterial network will consist of Golf Course Road, 79 Avenue and 'Road E'. The collector road pattern has been designed to minimize traffic volumes within each neighbourhood by utilizing short collector loops which serve only one neighbourhood each. The east-west collector road from Golf Course Road links the Southeast Area to Meridian Road, the downtown core, and future development to the west. It also provides a major access route to the senior

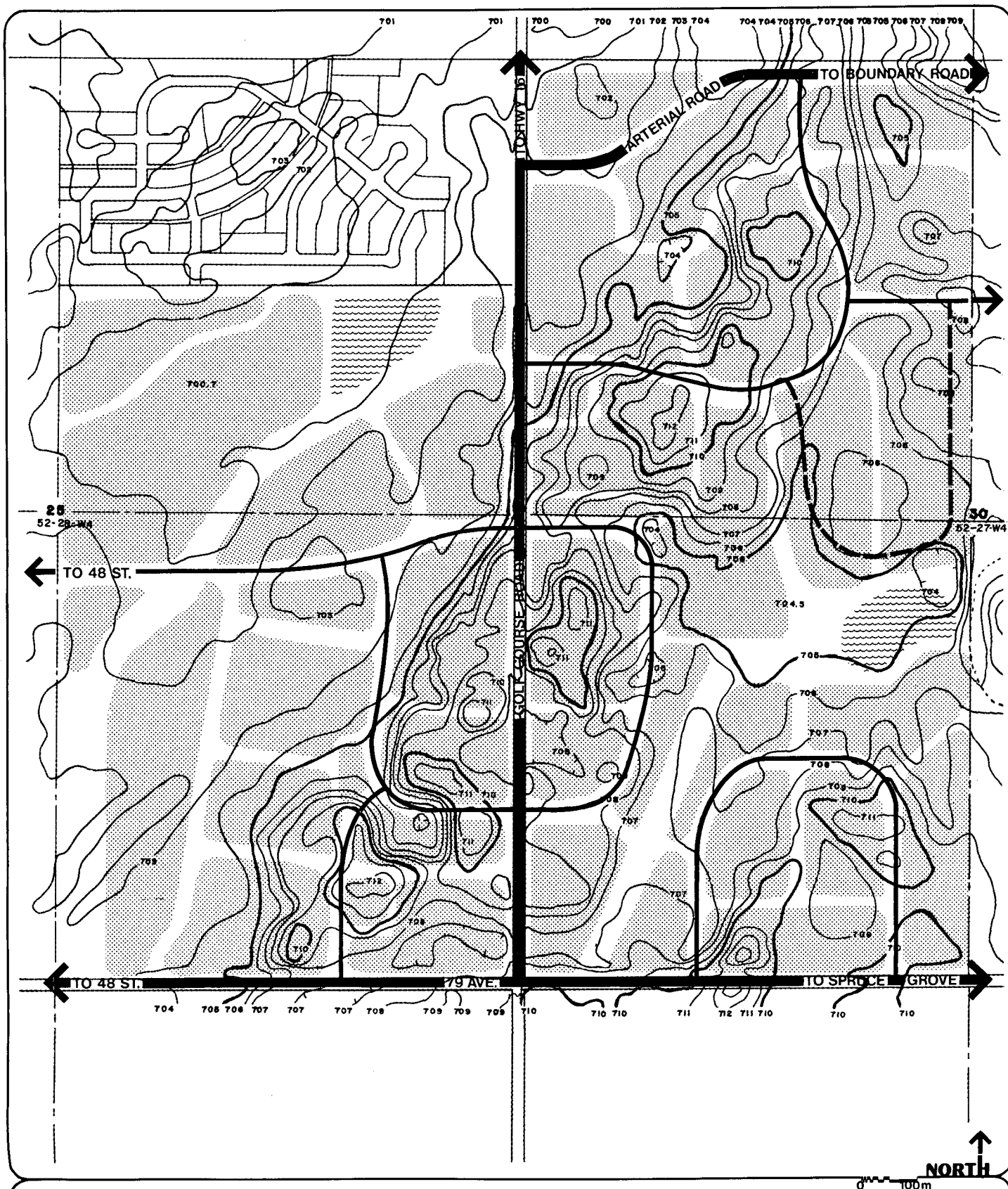


# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

- ..... WALKWAY
- ..... OPEN SPACE / SCHOOL SITE

Fig.9

## PEDESTRIAN & OPEN SPACE SYSTEM



# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

- ARTERIAL ROADS
- BUS COLLECTOR LOOPS
- MINOR COLLECTOR LOOP

Fig.10

## VEHICULAR TRANSPORTATION SYSTEM

high school site in conjunction with Golf Course Road. The detailed alignment of the east-west collector will be dependent on the appropriate intersection point with Meridian Road, and future land use proposals on lands immediately west of this Area Structure Plan site. This collector pattern eliminates potential through traffic on collectors within residential neighbourhoods. Inter-neighbourhood traffic and traffic generated from elsewhere will be directed to the arterial network. The collector loops will also provide convenient and efficient service by public transportation.

The local road pattern which is not shown in the Plan will be designed at the Tentative Plan of Subdivision stage of development, and will reflect the Town's roadway standards. In general the local roads will relate directly to the collector roads and consist primarily of loops, bays and cul-de-sacs. This type of road patterns fulfills the cellular concept of development and does not allow through-traffic on local streets, thus providing quite residential areas.

## SECTION 6

### SERVICING SCHEMES

#### 6.1 SITE GRADING

A substantial portion of the NE¼ of Sec.25 is within the 1 in 100 year flood plain. In order to develop lands in the flood plain, earth would have to be used to fill the low lands to an elevation higher than the 1 in 100 year flood elevation. The 1 in 100 year flood elevation (elevation 701.9 metres) was determined in the **Transportation and Utility System Study**. An extensive filling programme would be required to reclaim the flood plain lands.

The Study determined the 1 in 100 year flood elevation for Atim Creek in the Plan area to be 704.0 metres. A small portion of the SW¼ of Sec.30 is within the flood plain. This land can be reclaimed through site grading.

#### 6.2 STORMWATER MANAGEMENT CONCEPTS

##### 6.2.1 Existing (Natural) Drainage

Two drainage courses traverse, or are adjacent to the site and are integral to the stormwater management concept. The first drainage course, Streamcourse No. 3, traverses the western half of the site (E½ Sec.25-52-28 4), flowing in a northerly direction. The second drainage course is Atim Creek, flowing northwards along the eastern boundary of the site. As illustrated on Figure 4, a minor height of land divides the site into two drainage basins.

## 6.2.2 Stormwater Detention Facilities

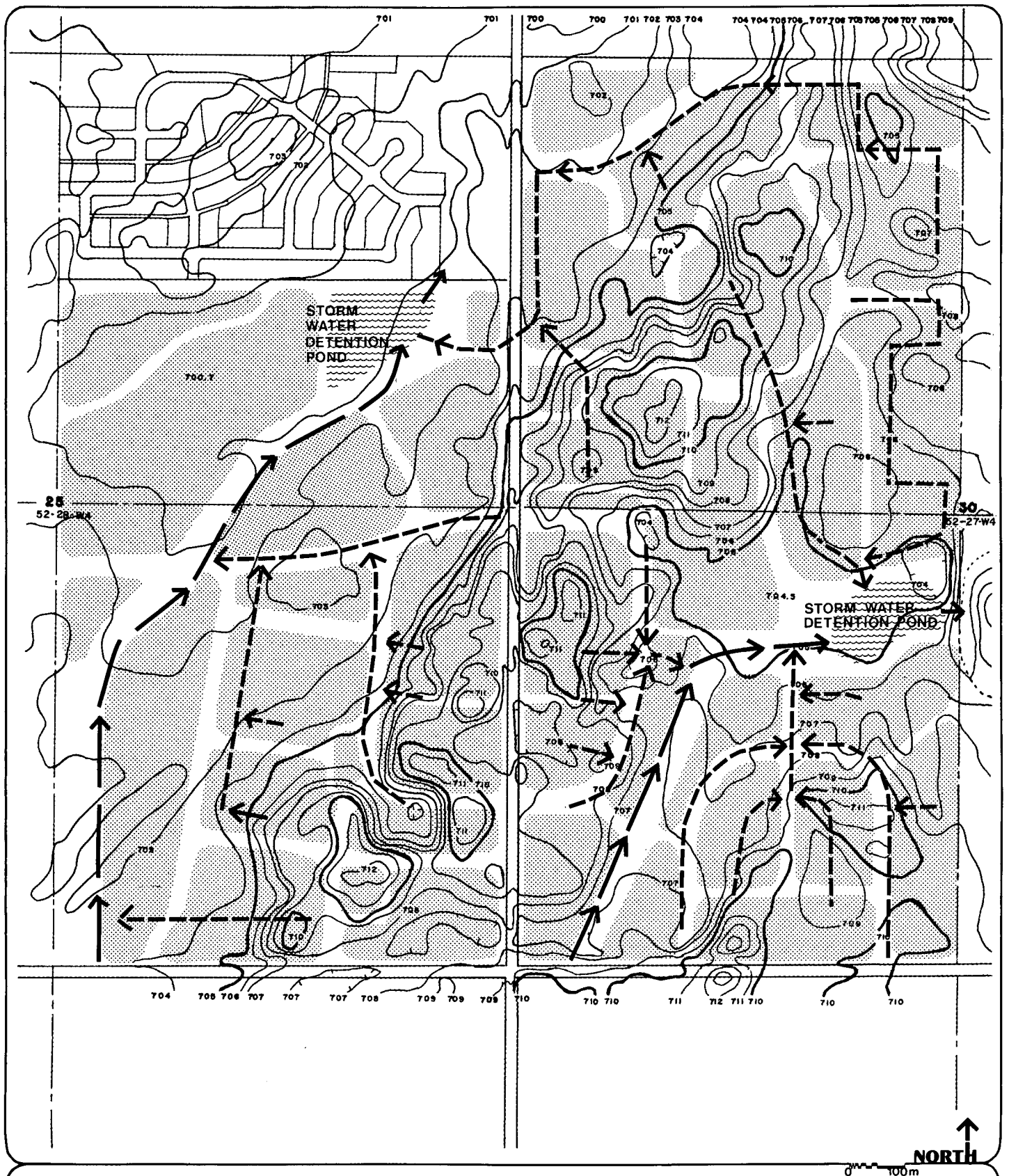
Two locations for stormwater detention ponds have been determined to control runoff from the development, as illustrated on Figure 11.

The first pond, 8.6 ha (21.25 acres) in conceptual surface area based on conceptual calculations, will be located within the NE¼ Sec.25-52-28-4. The pond will be a wet pond with the normal water level at the elevation of the adjacent drainage ditch. The storm runoff rate will be controlled by the pond, which will be discharged at the pre-development rate into the Streamcourse No. 3.

The second pond, 4.8 ha (11.9 acres) in conceptual surface area, will be located within the SW¼ Sec.30-52-27-4. The area adjacent to the pond will require filling in order to contain the floodplain area (elevation 704.0 metres) to the area encompassed by the storm pond. The storm water runoff from the subdivision will be discharged into Atim Creek at a pre-development rate. It should be noted that these pond sizes and locations are preliminary only, and will be further studied in the detailed planning stages.

The stormwater management concept presented herein differs from the concepts presented in the **Transportation and Utility Systems Study**, in that two stormwater ponds are proposed here, whereas three ponds were proposed in this study. Lakes M and O have been combined into the first pond discussed above which is located on Streamcourse No. 3. As the area comprising the first pond in its present location may be difficult to develop for other land uses because the surrounding area is within the 1 in 100 year flood plain, the construction of a storm pond at this location is an appropriate use of the land.

Another alteration to the stormwater management concept herein and those presented in the **Transportation and Utility System Study** is that the discharge from the pond located within the SW¼ Sec. 30 enters directly into Atim Creek. The previous concept inter-connected ponds N and O via an underground piped system. Two reasons dictate the preference of the Atim Creek discharge. Firstly, the storm pond which previously was inter-connected has been combined into a larger facility at a different location.



SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

Fig.11

# STORM WATER MANAGEMENT SYSTEM



With this change in location, the length of piping and grade restrictions make the previous concept uneconomical. Secondly, the two channels, Atim Creek and Streamcourse No. 3, converge upstream near Highway 16. As the two courses combine, the introduction of predevelopment flows from the pond at Atim Creek should not significantly alter the upstream channel conditions.

### **6.2.3 Minor Drainage System**

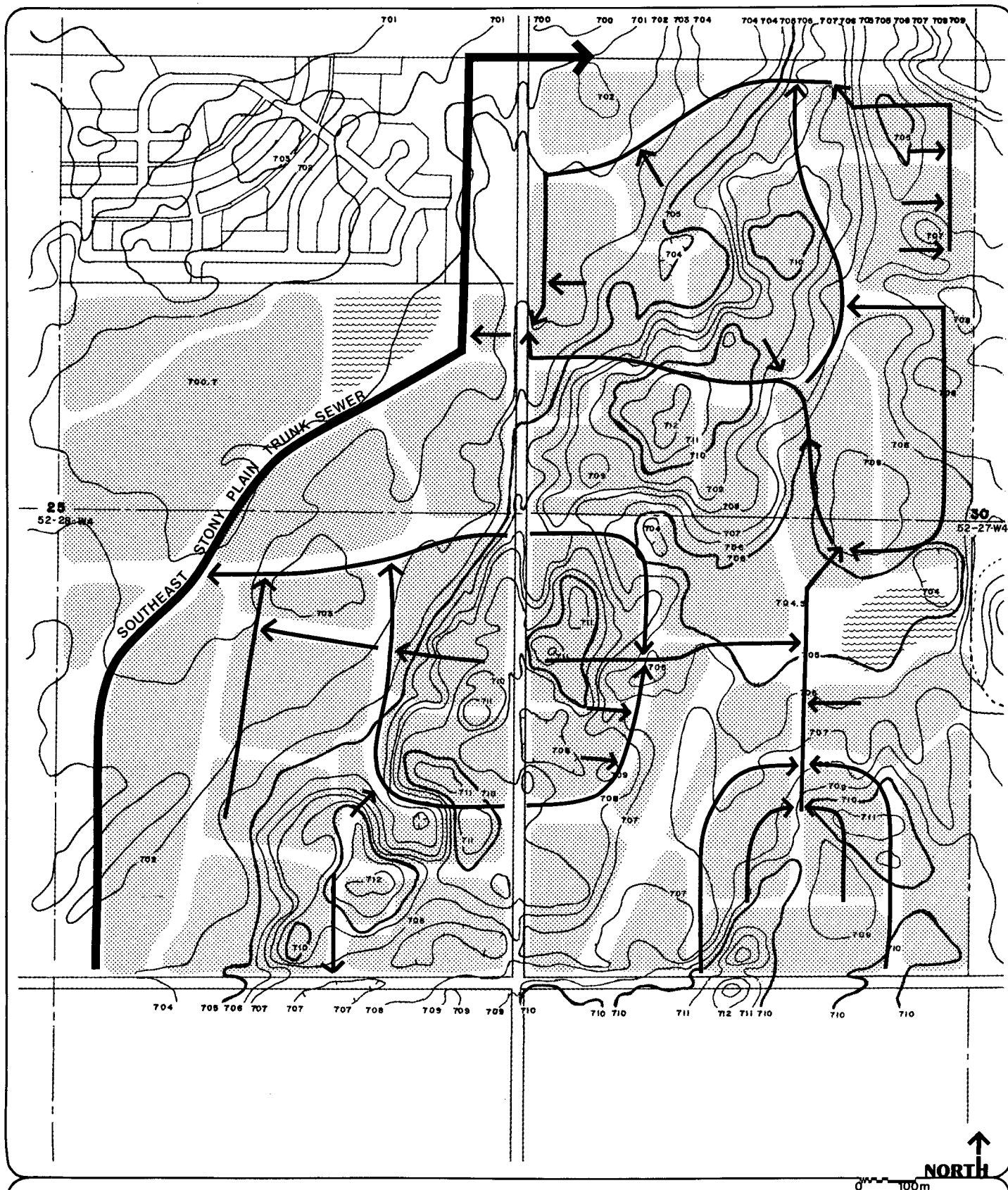
The minor drainage system is comprised of a piped underground sewer discharging directly into the stormwater detention ponds. This sewer system will be designed to convey a 1 in 5 year storm.

Figure 11 depicts the minor drainage system within the total stormwater management concept.

## **6.3 SANITARY SEWERAGE SYSTEM**

### **6.3.1 Off Site Services**

As noted on Figure 12, the Southeast Stony Plain Trunk Sewer, designed to service the Westerra Institute of Technology and the surrounding area, originates at the southwest corner of the site. This sewermain proceeds northwards following the alignment of Streamcourse No. 3 to a temporary connection to the Southridge subdivision. The temporary connection and the pipe located within the Plan area are considered to be the first construction phase of the sewermain which will be completed in the spring of 1983. Although the exact routing of the second phase has not been determined, it will probably traverse the Golf Course Subdivision and then parallel Atim Creek, to the main's interception by the Parkland Sewage Transmission Line. The second phase is scheduled for construction in 1984. The trunk sewer will have sufficient capacity, when the second phase is completed, to accommodate development within the Plan area. However, in order for development to proceed the Parkland Sewage Transmission line will have to be constructed.



SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

Fig.12

SANITARY SEWERAGE SYSTEM

## **6.5 DEVELOPMENT STAGING**

The sequence of development staging is based on three major criteria. First, initial stages will have direct access to existing arterial roadways. Since these access features are currently represented by Golf Course Road and 79th Avenue, lands adjacent to these routes should be considered for first phase development. The second staging criteria is servicing. Lands in the vicinity of the arterials can be serviced by the new Southeast Stony Plain Trunk Sewer and existing watermain to the north and west (see preceding sections). Finally, the development timing plans of the involved owners will also determine eventual staging.

The only definite staging factors which are recognized at this time are access and servicing potential. Therefore, the staging scheme for the Southeast Stony Plain Area Structure Plan orients initial developments along Golf Course Road and 79th Avenue. Further development beyond these areas are presently described as Stage II, as shown on Figure 14. The eventual delineation of detailed staging plans will be developed as a result of owner involvement, detailed servicing plans, and the general market demand for housing.

This staging approach has been produced in this general format to allow maximum flexibility for alterations as a reflection of growth pressures, Town policies, and owner priorities.

### 6.3.2 On Site Services

Local gravity sewer mains will convey the sewage flows to the trunk sewer main. These mains will vary in depth but should fall within the 3 to 6 metre (9.8 to 19.7 feet) range. Two connections to the trunk sewer main are required. The local sewers and the connections to the trunk sewer main are noted on Figure 12.

## 6.4 WATER SUPPLY AND DISTRIBUTION SYSTEM

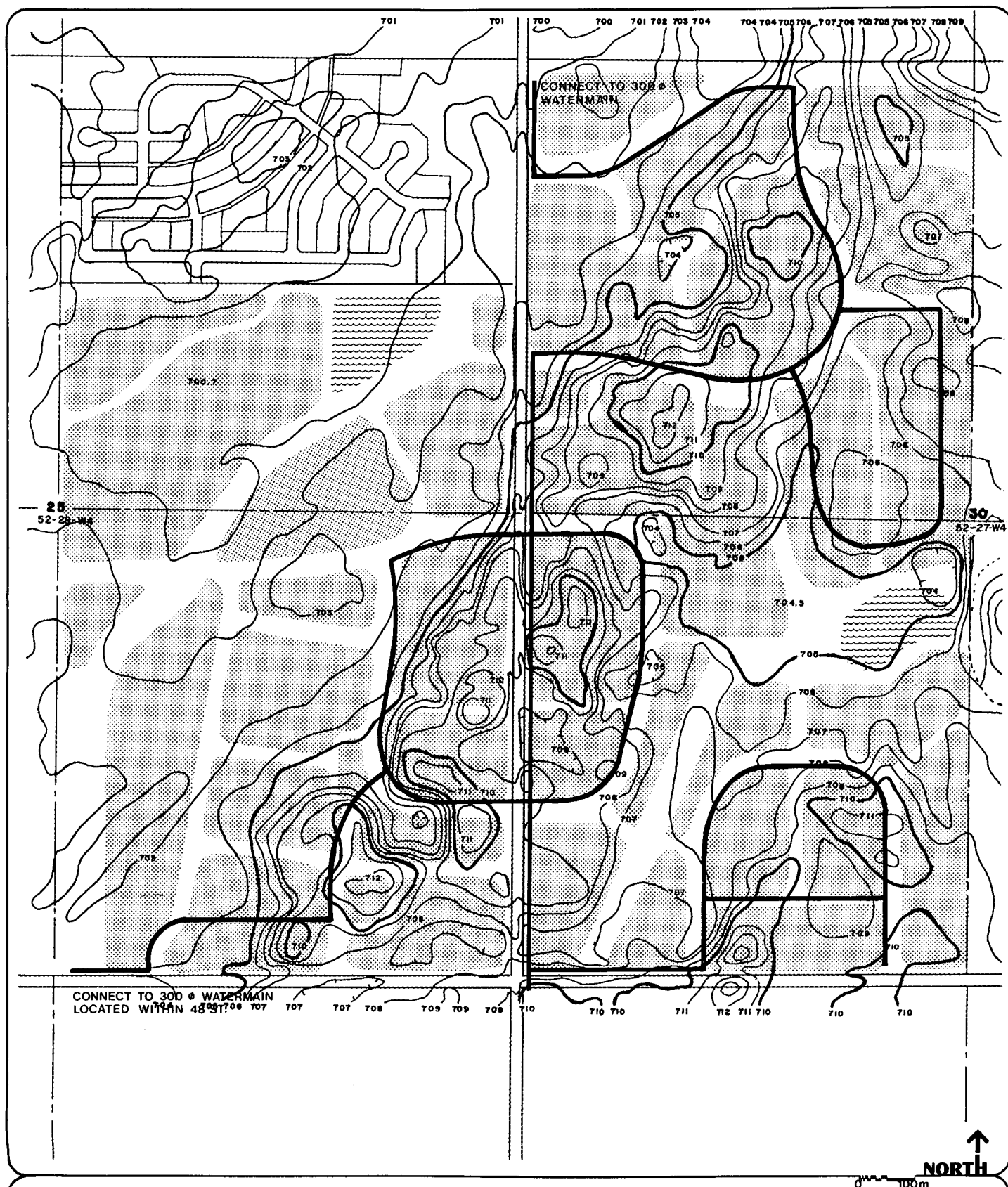
### 6.4.1 Off Site Services

Two off site water mains will provide the supply source for the distribution system contained within site's boundary. These mains, both of which are 300 mm (11.8 inch) diameter in size, are identified in the **Transportation and Utility System Study**. One main is located adjacent to the north boundary of the site and extends to 54th Avenue from Oatway Drive into the Golf Course Subdivision. The other main is located within 48th Street and extends from the downtown area to a point south of 79th Avenue.

### 6.4.2 On Site Services

A 250 mm (9.8 inch) diameter watermain interconnecting the two 300 mm (11.8 inch) diameter off site mains will provide the heart of the on site distribution system. This main will follow the road alignments through the subdivision as shown on Figure 13. The remainder of the water mains to complete the on site servicing shall be 150 mm (5.9 inch) diameter or 200 mm (8 inch) diameter in size.

A watermain reservoir is proposed to be located within the SE¼ Sec.25-52-28-4. Although this reservoir's primary function will be to service the Westerra Institute of Technology, the reservoir could be used to enhance the performance of the on site distribution system within the Plan area.

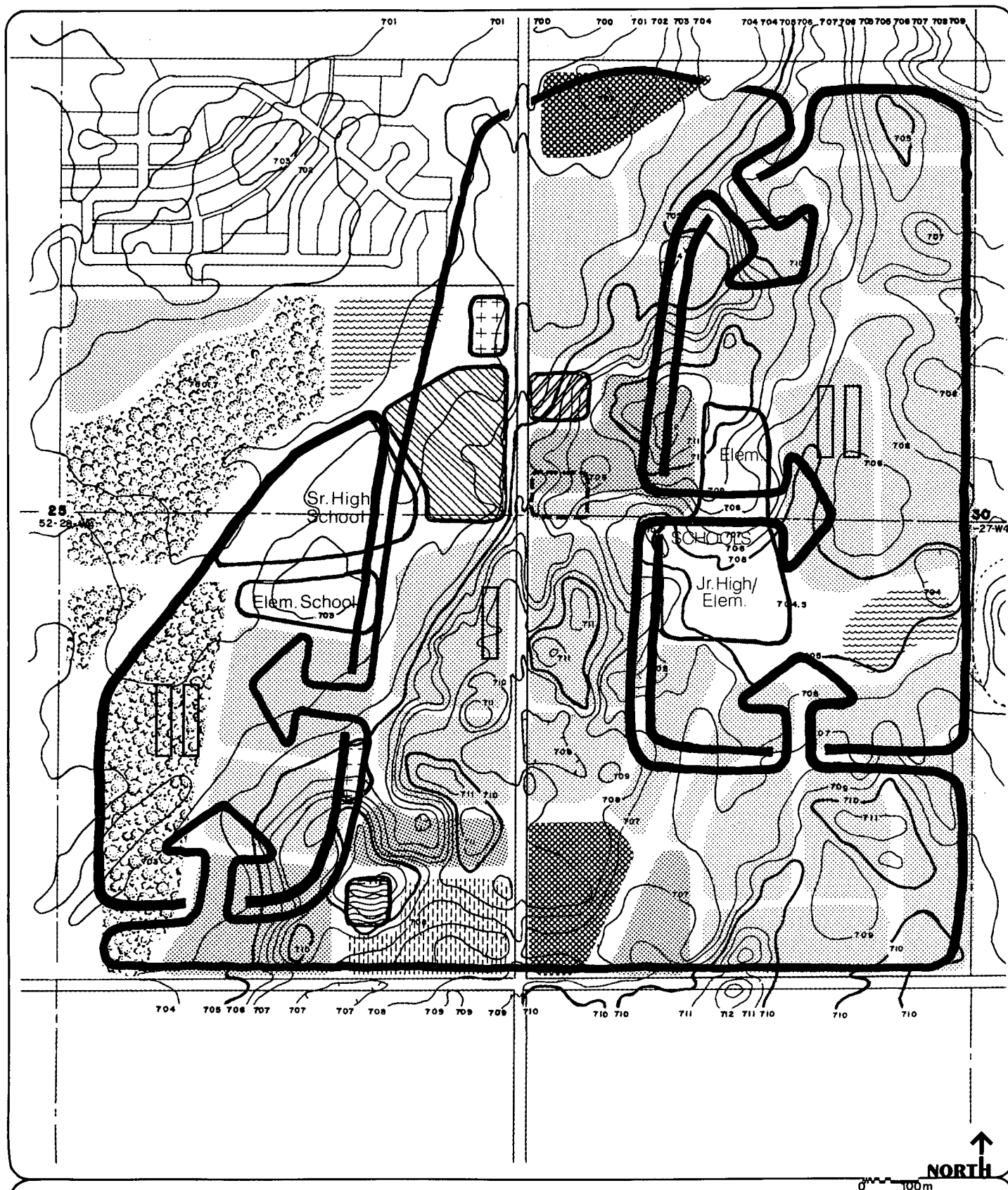


# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

— 250 Ø WATERMAIN

Fig.13

WATER SUPPLY  
AND DISTRIBUTION SYSTEM



# SOUTHEAST STONY PLAIN AREA STRUCTURE PLAN

- |  |                    |  |                             |
|--|--------------------|--|-----------------------------|
|  | SINGLE FAMILY DEV. |  | NEIGHBOURHOOD COMMERCIAL    |
|  | MEDIUM DENSITY     |  | ALTERNATE NEIGH. COMMERCIAL |
|  | HIGH DENSITY       |  | STORM WATER DETENTION POND  |
|  | CHURCH             |  | PRIVATE INSTITUTION         |
|  | NATURAL AREA       |  | WATER RESERVOIR             |
|  | SCHOOL             |  | HOSPITAL                    |

Fig.14

DEVELOPMENT STAGING