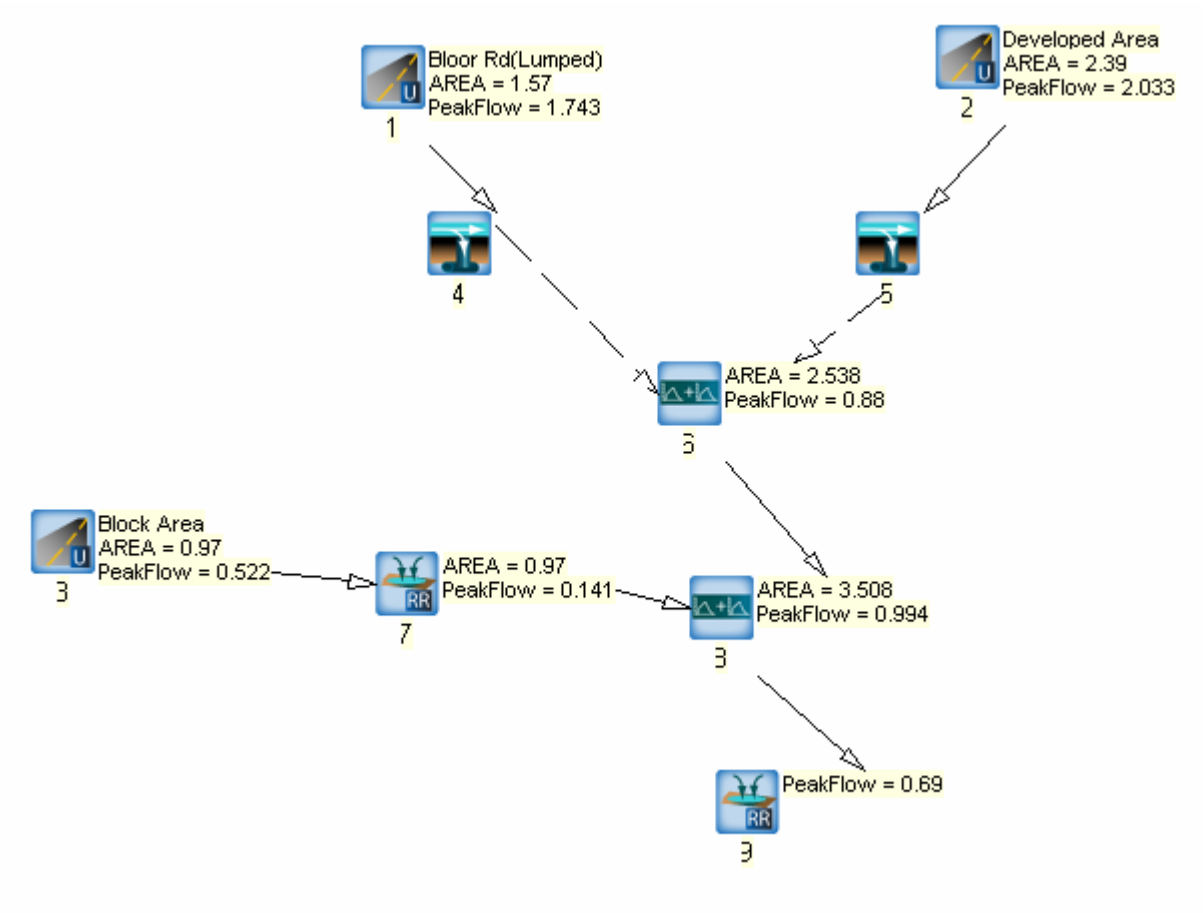
```
  ****************************

  W/E COMMAND              HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                   5.0
      [ Ptot= 39.43 mm ]
*
  *   CALIB STANDHYD     0003  1  5.0    2.24     .91  1.00  30.13  .76    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    1.68     .39  1.00  22.11  .56    .000
      [I%=43.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    3.17    1.72  1.00  38.14  .97    .000
      [I%=99.0:S%= 2.00]
*
      RESRVR [ 2 : 0003] 0009  1  5.0    2.24     .25  1.08  30.12  n/a    .000
      {ST=   .03 ha.m }
*
      DUHYD              0007  1  5.0    1.68     .39  1.00  22.11  n/a    .000
         MAJOR SYSTEM:   0007  2  5.0     .28     .21  1.00  22.11  n/a    .000
         MINOR SYSTEM:   0007  3  5.0    1.40     .18  1.00  22.11  n/a    .000
*
      DUHYD              0006  1  5.0    3.17    1.72  1.00  38.14  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0     .71     .90  1.00  38.14  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.46     .82  1.00  38.14  n/a    .000
*
      ADD [0007 + 0006]  0008  3  5.0    3.87    1.00  1.00  32.33  n/a    .000
*
      ADD [0009 + 0008]  0010  3  5.0    6.11    1.21  1.00  31.52  n/a    .000
*
      RESRVR [ 2 : 0010] 0011  1  5.0    6.11     .76  1.08  31.52  n/a    .000
      {ST=   .03 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                   5.0
      [ Ptot= 47.29 mm ]
*
  *   CALIB STANDHYD     0003  1  5.0    2.24    1.15  1.00  36.79  .78    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    1.68     .50  1.00  27.62  .58    .000
      [I%=43.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    3.17    2.16  1.00  45.96  .97    .000
      [I%=99.0:S%= 2.00]
*
      RESRVR [ 2 : 0003] 0009  1  5.0    2.24     .26  1.17  36.79  n/a    .000
```

```
      {ST=   .04 ha.m }
*
      DUHYD              0007  1  5.0    1.68     .50  1.00  27.62  n/a    .000
         MAJOR SYSTEM:   0007  2  5.0     .35     .32  1.00  27.62  n/a    .000
         MINOR SYSTEM:   0007  3  5.0    1.33     .18  1.00  27.62  n/a    .000
*
      DUHYD              0006  1  5.0    3.17    2.16  1.00  45.96  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0     .88    1.34  1.00  45.96  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.29     .82  1.00  45.96  n/a    .000
*
      ADD [0007 + 0006]  0008  3  5.0    3.63    1.00  1.00  39.21  n/a    .000
*
      ADD [0009 + 0008]  0010  3  5.0    5.87    1.22  1.00  38.29  n/a    .000
*
      RESRVR [ 2 : 0010] 0011  1  5.0    5.87     .81  1.17  38.29  n/a    .000
      {ST=   .04 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                 5.0
      [ Ptot= 55.05 mm ]
*
  *   CALIB STANDHYD     0003  1  5.0    2.24    1.42  1.00  43.50  .79    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    1.68     .60  1.00  33.30  .60    .000
      [I%=43.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    3.17    2.55  1.00  53.69  .98    .000
      [I%=99.0:S%= 2.00]
*
      RESRVR [ 2 : 0003] 0009  1  5.0    2.24     .26  1.17  43.49  n/a    .000
      {ST=   .05 ha.m }
*
      DUHYD              0007  1  5.0    1.68     .60  1.00  33.30  n/a    .000
         MAJOR SYSTEM:   0007  2  5.0     .40     .41  1.00  33.30  n/a    .000
         MINOR SYSTEM:   0007  3  5.0    1.28     .18  1.00  33.30  n/a    .000
*
      DUHYD              0006  1  5.0    3.17    2.55  1.00  53.69  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0     .97    1.73  1.00  53.69  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.20     .82  1.00  53.69  n/a    .000
*
      ADD [0007 + 0006]  0008  3  5.0    3.48    1.00  1.00  46.21  n/a    .000
*
      ADD [0009 + 0008]  0010  3  5.0    5.72    1.25  1.00  45.15  n/a    .000
*
      RESRVR [ 2 : 0010] 0011  1  5.0    5.72     .81  1.17  45.15  n/a    .000
      {ST=   .04 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************
```

```
  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                  5.0
      [ Ptot= 65.31 mm ]
*
  *   CALIB STANDHYD     0003  1  5.0    2.24    1.71  1.00  52.49  .80    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    1.68     .76  1.00  41.09  .63    .000
      [I%=43.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    3.17    3.05  1.00  63.90  .98    .000
      [I%=99.0:S%= 2.00]
*
      RESRVR [ 2 : 0003] 0009  1  5.0    2.24     .26  1.17  52.49  n/a    .000
      {ST=   .06 ha.m }
*
      DUHYD              0007  1  5.0    1.68     .76  1.00  41.09  n/a    .000
         MAJOR SYSTEM:   0007  2  5.0     .55     .58  1.00  41.09  n/a    .000
         MINOR SYSTEM:   0007  3  5.0    1.13     .18  1.00  41.09  n/a    .000
*
      DUHYD              0006  1  5.0    3.17    3.05  1.00  63.90  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0    1.05    2.23  1.00  63.90  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.12     .82  1.00  63.90  n/a    .000
*
      ADD [0007 + 0006]  0008  3  5.0    3.25    1.00  1.00  55.98  n/a    .000
*
      ADD [0009 + 0008]  0010  3  5.0    5.49    1.27  1.00  54.56  n/a    .000
*
      RESRVR [ 2 : 0010] 0011  1  5.0    5.49     .81  1.17  54.56  n/a    .000
      {ST=   .05 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                  5.0
      [ Ptot= 72.92 mm ]
*
  *   CALIB STANDHYD     0003  1  5.0    2.24    1.94  1.00  59.27  .81    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    1.68     .87  1.00  47.06  .65    .000
      [I%=43.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    3.17    3.43  1.00  71.49  .98    .000
      [I%=99.0:S%= 2.00]
*
      RESRVR [ 2 : 0003] 0009  1  5.0    2.24     .26  1.17  59.27  n/a    .000
      {ST=   .07 ha.m }
```

```
*
      DUHYD              0007  1  5.0    1.68     .87  1.00  47.06  n/a    .000
         MAJOR SYSTEM:   0007  2  5.0     .60     .68  1.00  47.06  n/a    .000
         MINOR SYSTEM:   0007  3  5.0    1.08     .18  1.00  47.06  n/a    .000
*
      DUHYD              0006  1  5.0    3.17    3.43  1.00  71.49  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0    1.11    2.61  1.00  71.49  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.06     .82  1.00  71.49  n/a    .000
*
      ADD [0007 + 0006]  0008  3  5.0    3.14    1.00  1.00  63.11  n/a    .000
*
      ADD [0009 + 0008]  0010  3  5.0    5.38    1.27  1.08  61.51  n/a    .000
*
      RESRVR [ 2 : 0010] 0011  1  5.0    5.38     .81  1.17  61.51  n/a    .000
      {ST=    .05 ha.m }
*
 FINISH
```

Bloor Street Subcatchment



```
================================================================================
====================

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO

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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files\Visual OTTHYMO 2.2.1\voin.dat
  Output  filename: H:\OTHER CLIENTS\IT01-0004 - iTRANS Response to City of Toronto
Comments for IT01-0002\Working\Hydrology Model(Updated)\
  Summary filename: H:\OTHER CLIENTS\IT01-0004 - iTRANS Response to City of Toronto
Comments for IT01-0002\Working\Hydrology Model(Updated)\


DATE: 12/09/2007                          TIME: 2:04:23 PM

USER:


COMMENTS: _____________________________________________________________


  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                  5.0
      [ Ptot= 27.31 mm ]
*
  *   CALIB STANDHYD     0002  1  5.0    2.39     .60  1.00  20.11  .74    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    1.57     .58  1.00  26.10  .96    .000
      [I%=99.0:S%= 2.00]
*
  *   CALIB STANDHYD     0003  1  5.0     .97     .15  1.00  14.12  .52    .000
```

```
      [I%=43.0:S%= 2.00]
*
      DUHYD              0005  1  5.0    2.39     .60  1.00  20.11  n/a    .000
         MAJOR SYSTEM:   0005  2  5.0     .22     .15  1.00  20.11  n/a    .000
         MINOR SYSTEM:   0005  3  5.0    2.17     .45  1.00  20.11  n/a    .000
*
      DUHYD              0004  1  5.0    1.57     .58  1.00  26.10  n/a    .000
         MAJOR SYSTEM:   0004  2  5.0     .17     .15  1.00  26.10  n/a    .000
         MINOR SYSTEM:   0004  3  5.0    1.40     .43  1.00  26.10  n/a    .000
*
      RESRVR [ 2 : 0003] 0007  1  5.0     .97     .09  1.08  14.12  n/a    .000
      {ST=   .00 ha.m }
*
      ADD [0005 + 0004]  0006  3  5.0    3.57     .88  1.00  22.46  n/a    .000
*
      ADD [0006 + 0007]  0008  3  5.0    4.54     .95  1.00  20.68  n/a    .000
*
      RESRVR [ 2 : 0008] 0009  1  5.0    4.54     .55  1.08  20.68  n/a    .000
      {ST=   .02 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                  5.0
      [ Ptot= 39.43 mm ]
*
  *   CALIB STANDHYD     0002  1  5.0    2.39     .94  1.00  30.13  .76    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    1.57     .89  1.00  38.14  .97    .000
      [I%=99.0:S%= 2.00]
*
  *   CALIB STANDHYD     0003  1  5.0     .97     .24  1.00  22.10  .56    .000
      [I%=43.0:S%= 2.00]
*
      DUHYD              0005  1  5.0    2.39     .94  1.00  30.13  n/a    .000
         MAJOR SYSTEM:   0005  2  5.0     .49     .49  1.00  30.13  n/a    .000
         MINOR SYSTEM:   0005  3  5.0    1.90     .45  1.00  30.13  n/a    .000
*
      DUHYD              0004  1  5.0    1.57     .89  1.00  38.14  n/a    .000
         MAJOR SYSTEM:   0004  2  5.0     .36     .46  1.00  38.14  n/a    .000
         MINOR SYSTEM:   0004  3  5.0    1.21     .43  1.00  38.14  n/a    .000
*
      RESRVR [ 2 : 0003] 0007  1  5.0     .97     .11  1.08  22.10  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0005 + 0004]  0006  3  5.0    3.11     .88  1.00  33.25  n/a    .000
*
      ADD [0006 + 0007]  0008  3  5.0    4.08     .98  1.00  30.60  n/a    .000
*
      RESRVR [ 2 : 0008] 0009  1  5.0    4.08     .62  1.08  30.59  n/a    .000
      {ST=   .03 ha.m }
*
```

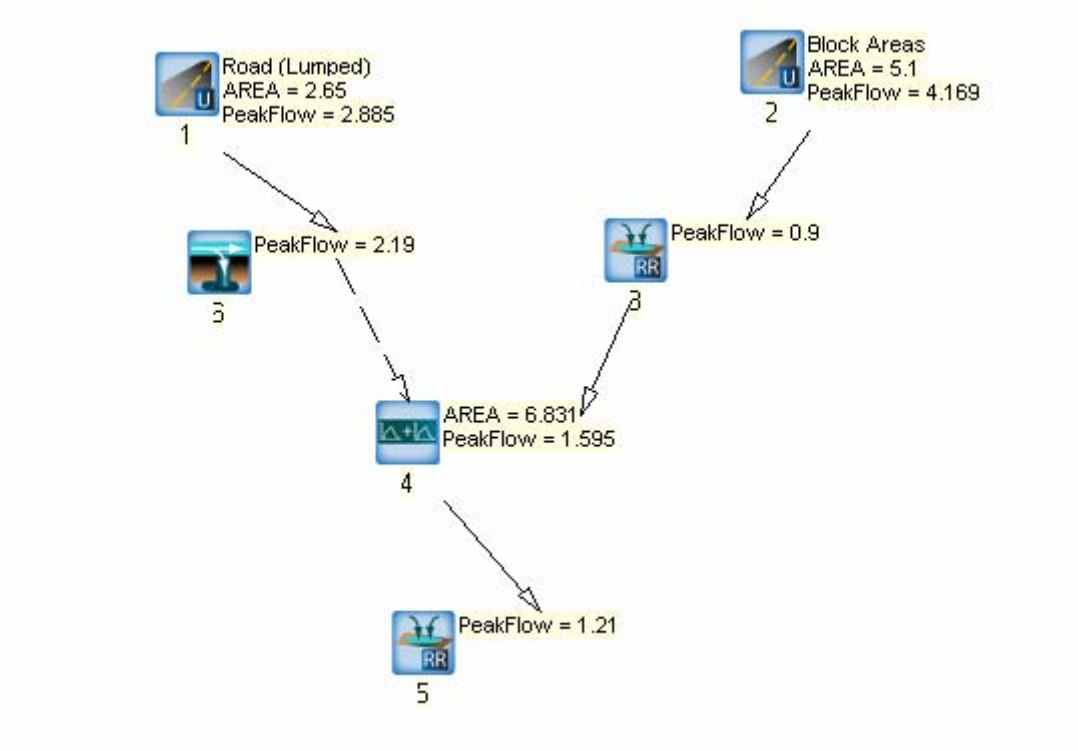
```
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                    5.0
      [ Ptot= 72.92 mm ]
*
  *   CALIB STANDHYD     0002  1  5.0    2.39    2.03  1.00  59.27  .81    .000
      [I%=71.0:S%= 2.00]
*
  *   CALIB STANDHYD     0001  1  5.0    1.57    1.74  1.00  71.49  .98    .000
      [I%=99.0:S%= 2.00]
*
  *   CALIB STANDHYD     0003  1  5.0     .97     .52  1.00  47.05  .65    .000
      [I%=43.0:S%= 2.00]
*
      DUHYD              0005  1  5.0    2.39    2.03  1.00  59.27  n/a    .000
         MAJOR SYSTEM:   0005  2  5.0     .87    1.59  1.00  59.27  n/a    .000
         MINOR SYSTEM:   0005  3  5.0    1.52     .45  1.00  59.27  n/a    .000
*
      DUHYD              0004  1  5.0    1.57    1.74  1.00  71.49  n/a    .000
         MAJOR SYSTEM:   0004  2  5.0     .55    1.31  1.00  71.49  n/a    .000
         MINOR SYSTEM:   0004  3  5.0    1.02     .43  1.00  71.49  n/a    .000
*
      RESRVR [ 2 : 0003] 0007  1  5.0     .97     .14  1.17  47.05  n/a    .000
      {ST=   .02 ha.m }
*
      ADD [0005 + 0004]  0006  3  5.0    2.54     .88  1.00  64.18  n/a    .000
*
      ADD [0006 + 0007]  0008  3  5.0    3.51     .99  1.00  59.44  n/a    .000
*
      RESRVR [ 2 : 0008] 0009  1  5.0    3.51     .69  1.17  59.44  n/a    .000
      {ST=   .04 ha.m }
*
 FINISH

================================================================================
======================
```

West Wood Theatre Street Subcatchment



==========

```
       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** S U M M A R Y O U T P U T *****

Input filename: C:\Program Files\Visual OTTHYMO 2.2.1\voin.dat
Output filename: H:\OTHER CLIENTS\IT01-0004 - iTRANS Response to City of Toronto Comments for IT01-0002\Working\Hydrology Model(Updated)\
Summary filename: H:\OTHER CLIENTS\IT01-0004 - iTRANS Response to City of Toronto Comments for IT01-0002\Working\Hydrology Model(Updated)\

DATE: 12/09/2007 TIME: 2:09:14 PM

USER:

COMMENTS: _____

****
** SIMULATION NUMBER: 1 **
****

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ .00 hrs								
	CHIC STORM		5.0						
	[Ptot= 27.31 mm]								
*									
*	CALIB STANDHYD	0001 1	5.0	2.65	.93	1.00	26.10	.96	.000
	[I%=99.0:S%= 2.00]								
*									
*	CALIB STANDHYD	0002 1	5.0	5.10	1.19	1.00	20.11	.74	.000
	[I%=71.0:S%= 2.00]								
*									

```
      DUHYD              0006  1  5.0    2.65     .93  1.00  26.10  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0     .27     .24  1.00  26.10  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.38     .69  1.00  26.10  n/a    .000
*
      RESRVR [ 2 : 0002] 0003  1  5.0    5.10     .80  1.08  20.11  n/a    .000
      {ST=   .02 ha.m }
*
      ADD [0006 + 0003]  0004  3  5.0    7.48    1.26  1.00  22.01  n/a    .000
*
      RESRVR [ 2 : 0004] 0005  1  5.0    7.48    1.10  1.08  22.01  n/a    .000
      {ST=   .02 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                 5.0
      [ Ptot= 39.43 mm ]
*
  *   CALIB STANDHYD     0001  1  5.0    2.65    1.45  1.00  38.14  .97    .000
      [I%=99.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    5.10    1.90  1.00  30.13  .76    .000
      [I%=71.0:S%= 2.00]
*
      DUHYD              0006  1  5.0    2.65    1.45  1.00  38.14  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0     .59     .76  1.00  38.14  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    2.06     .69  1.00  38.14  n/a    .000
*
      RESRVR [ 2 : 0002] 0003  1  5.0    5.10     .90  1.08  30.13  n/a    .000
      {ST=   .04 ha.m }
*
      ADD [0006 + 0003]  0004  3  5.0    7.16    1.59  1.00  32.43  n/a    .000
*
```

```
      RESRVR [ 2 : 0004] 0005  1  5.0    7.16    1.21  1.08  32.43  n/a    .000
      {ST=    .03 ha.m }
*
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                   5.0
      [ Ptot= 72.92 mm ]
*
  *   CALIB STANDHYD     0001  1  5.0    2.65    2.89  1.00  71.49  .98    .000
      [I%=99.0:S%= 2.00]
*
  *   CALIB STANDHYD     0002  1  5.0    5.10    4.17  1.00  59.27  .81    .000
      [I%=71.0:S%= 2.00]
*
      DUHYD              0006  1  5.0    2.65    2.89  1.00  71.49  n/a    .000
         MAJOR SYSTEM:   0006  2  5.0     .92    2.19  1.00  71.49  n/a    .000
         MINOR SYSTEM:   0006  3  5.0    1.73     .69  1.00  71.49  n/a    .000
*
      RESRVR [ 2 : 0002] 0003  1  5.0    5.10     .90  1.17  59.27  n/a    .000
      {ST=    .12 ha.m }
*
      ADD [0006 + 0003]  0004  3  5.0    6.83    1.60  1.08  62.37  n/a    .000
*
      RESRVR [ 2 : 0004] 0005  1  5.0    6.83    1.21  1.17  62.37  n/a    .000
      {ST=    .04 ha.m }
*
 FINISH

================================================================================
====================
```

Appendix B

Water Balance Analysis

Water Balance Analysis

Six Point Interchange Analysis

Existing Area Calculation

Land Uses	Existing Area (ha)	Future Area (ha)
Res. Low Density	1.68	1.68
Road ROW	4.2	7.39
Open Land(grass)	3.26	0
Commercial	2.39	2.39
Open Land (Paved)	7.92	0
High Rise	0	8.31
Total Area	19.45	19.77

URF ANNUAL VALUES FROM EBNFLO Environmental Report (2004)

Land Use	Type		SUPY+ SURLI	AGWI-AGWET
		DSN	(mm)	(mm)
Res. Low Density	RLD3cd	1009	651	140.72
Road ROW	THCcd	5003	674.3	196.63
Open Land(grass)	OPLcd	4003	724.8	134.34
Commercial	CSM	2201	32.2	7.01
Open Land (Paved)	THCcd	5003	674.3	196.63
High Rise	RHRcd	1306	402.7	76.14

EXISTING CONDITION ESTIMATION

	Area	SUPY+ SURLI	AGWI-AGWET	SUPY+ SURLI	AGWI-AGWET
Existing Condition	ha	mm	mm	ha.mm	ha.mm
Res. Low Density	1.68	651	140.72	1093.7	236.4
Road ROW	4.2	674.3	196.63	2832.1	825.8
Open Land(grass)	3.26	724.8	134.34	2362.8	437.9
Commercial	2.39	32.2	7.01	77.0	16.8
Open Land (Paved)	7.92	674.3	196.63	5340.5	1557.3
	19.45		675.33	11706.00	3074.27

Annual av water supply =	601.85	mm
Annual Av. Infiltration =	158.1	mm

FUTURE CONDITION ESTIMATION

	Area	SUPY+ SURLI	AGWI-AGWET	SUPY+ SURLI	AGWI-AGWET
Future Condition	ha	mm	mm	ha.mm	ha.mm
Res. Low Density	1.68	651	140.72	1093.68	236.4
Road ROW	7.39	674.3	196.63	4983.077	1453.1
Commercial	2.39	32.2	7.01	76.958	16.8
High Rise	8.31	402.7	76.14	3346.437	632.7
	19.77			9500.15	2338.98

Annual av water supply =	480.53	mm
Annual Av. Infiltration =	118.3	mm

Please Note: The open land with paved surface in West Wood Theatre lands are modelled as Road surfaces

Appendix C

Clean Water Collector Fact Sheet

Clean Water Collector - Fact Sheet

The Clean Water Collector (CWC) system is a new municipal storm water servicing technology developed to enhance safe groundwater recharge in lands undergoing urban development. The CWC system is different than other groundwater recharge methods because it uses only clean water from roof areas.

The system will be implemented in the area known as Block 12 in Vaughan. Block 12 (bordered by Major Mackenzie Drive, Dufferin Street, Bathurst Street and Elgin Mills Road) is partly within the Oak Ridges Moraine (ORM). One of the primary functions of the ORM is to replenish groundwater aquifers, streams, wetlands, ponds and other surface water systems.

Maintaining infiltration is an important objective in new development areas. The CWC system works by collecting the runoff water from the roofs for replenishing the ground water. Normally, eaves troughs and vertical roof-leaders at the side of buildings collect the rainfall and snowmelt water and direct it to splash pads on the ground. Instead of splashing on the surface and flowing towards the road, the CWC system will convey the water to a special perforated pipe under the road. The pipe will distribute the water into the surrounding stone trench. The trench will also contain the standard storm and sanitary sewers. The combined volume in the perforated pipe and void spaces in the trench will be available for capturing the runoff from roof areas.

The CWC Research Station was constructed to test the installation and performance of the system under real climate and site conditions. The station replicates the dimensions of a typical house roof, yard, driveway, sidewalk, boulevard, and roadway. Sensors are located at various locations to measure the flow from the roof area contributing water directly into the ground and the runoff from the remaining areas adding flow into the traditional storm sewer.

The monitoring system measures storm water flows and also the water level in the CWC trench and surrounding ground water. The ground water monitoring piezometers measure impacts on the surrounding water table near and further from the site. These sensors monitor changes in the water table levels due to the infiltration from the CWC system. A climate station was also installed adjacent to the site to quantify the rainfall and snowmelt inputs into the CWC system and standard storm sewer.

The results after 1 year of operation have demonstrated excellent the CWC system performance. All roof runoff (100%) has been captured and infiltrated including the largest storm event, which occurred on June 8th, 2003 and produced of 34 mm of rain. During this event, the maximum storage utilized was about 70% of the total available storage in the system. An overflow system has been provided in the event of a very large storm exceeding the system capacity. Overflows would also be monitored and directed into the standard storm sewer.

For further information please contact Clarifica Inc.
Tel: (905) 223-2314 Fax: (905) 223-2315
E-mail: clarifica@clarifica.com

Appendix F.4

Natural Environment

LGL Limited

FINAL
NATURAL SCIENCES REPORT

SIX POINTS INTERCHANGE RECONFIGURATION

prepared for:

ITRANS CONSULTING INC.
AND
THE CITY OF TORONTO

prepared by:

DECEMBER 2006

FINAL
NATURAL SCIENCES REPORT

SIX POINTS INTERCHANGE RECONFIGURATION

prepared by:

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DECEMBER 2006

LGL Project # TA2985

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1.0 INTRODUCTION

The City of Toronto is conducting a Municipal Class Environmental Assessment (MEA 2000) to investigate the reconfiguration of the intersection of Kipling Avenue, Dundas Street West and Bloor Street West, also known as Six Points Interchange, in the City of Toronto. The study area is presented in Figure 1. iTRANS Consulting Inc. is conducting the study on behalf of the City of Toronto. LGL Limited, as a sub-consultant to iTRANS, is providing natural sciences services. This Natural Science Report documents the results of data collection and analysis and forms an appendix to the Environmental Study Report.

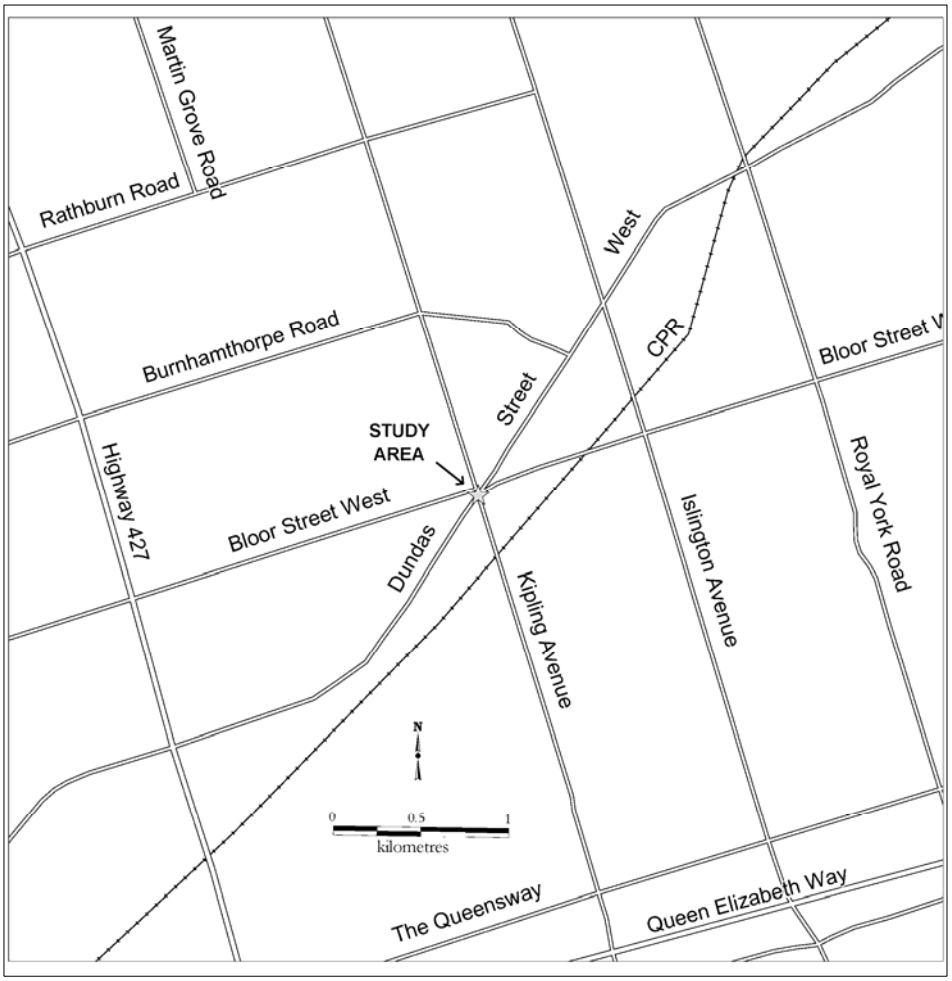

FIGURE 1. KEY PLAN OF THE STUDY AREA

2.0 EXISTING CONDITIONS

The following discussion outlines the existing environmental conditions within the study area and identifies natural heritage areas and/or features of environmental sensitivity and/or significance.

2.1 Physiography and Soils

The study area is located within the Iroquois Plain physiographic region, a well-drained sloping sand plain that extends around the western part of Lake Ontario, from the Niagara River to the Trent River (Chapman and Putnam 1984).

The soil in the study area is classified as Chinguacousy clay loam. Chinguacousy clay loam soils are imperfectly drained and consist of limestone and shale parent materials. The topography for this soil is smooth to gently sloping and erosion is slight as a result of low run-off (Hoffman and Richards 1955).

2.2 Aquatic Habitats and Communities

The study area falls within the Mimico Creek watershed. No watercourses that directly support fish habitat are located within the project limits.

2.3 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of vegetation communities. Field investigations of natural/semi-natural vegetation were conducted within the study area on December 17, 2003 and September 14, 2004 to ground truth the boundaries of vegetation communities and to conduct a botanical survey. A landscape/ornamental tree inventory of trees with a diameter at breast height (dbh) greater than 10 cm surrounding Six Points Interchange was also conducted during field investigations.

Vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al*. 1998). The community was sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Vascular plant nomenclature follows Morton and Venn (1990) with a few exceptions.

2.3.1 Vegetation Communities

Virtually all vegetation within the study area is of anthropogenic origin, resulting from past/present urban and commercial land use. The remaining vegetation within the study area is highly disturbed, comprising scattered ornamental and hedgerow trees and manicured grassland. New development in the area has resulted in the removal of a previously treed area, which was located south of Dundas Street West and west of Kipling Avenue (Figure 2). No natural vegetation communities were observed during field investigations and few semi-natural (cultural) vegetation communities are present within the study area.

One ELC vegetation community, a Dry-Moist Old Field Cultural Meadow (CUM1-1), was identified north of the railway line, east of Kipling Avenue, during field investigations. This community is riddled with refuse, such as piles of old asphalt, but has been colonized by plant species typical of a Dry-Moist Old Field Cultural Meadow (CUM1-1). Dominant species in this community include brome (*Bromus inermis inermis*), tall goldenrod (*Solidago altissima*), heather aster (*Aster ericoides*), New England aster (*A. novae-angliae*), common evening primrose (*Oenothera biennis*), butter-and-eggs (*Linaria vulgaris*), timothy (*Phleum pratense*) and bluegrasses (*Poa* spp.). This community is delineated in Figure 2.

A sparse hedgerow surrounds a large parking lot to the southeast of Six Points Interchange. Young trees of species such as Siberian elm (*Ulmus pumila*), green ash (*Fraxinus pennsylvanica*) and Manitoba maple (*Acer negundo*) dominate this hedgerow. Understorey species in this hedgerow include riverbank grape (*Vitis riparia*), common buckthorn (*Rhamnus cathartica*), thicket creeper (*Parthenocissus inserta*), choke cherry (*Prunus virginiana*) and staghorn sumac (*Rhus typhina*). Ground cover species are typical of those in the Dry-Moist Old Field Cultural Meadow (CUM1-1) community, especially in locations where the hedgerow is adjacent to this community. Representative photographs of the study area are presented in Appendix A.

LEGEND

- Specimen Trees
- Vegetation Community Boundary
- 1 - 60 Specimen ID

Vegetation Communities

- CUM1-1 Dry-Moist Old Field Meadow Type
- CUW Cultural Woodland

Data Source: LGL Limited field surveys.

EXISTING CONDITIONS

LGL Limited
environmental research associates

PROJECT:	TA2985	**FIGURE:**	2
DATE:	October 2004	**PREPARED BY:**	MWF
SCALE:	1 : 3,869	**CHECKED BY:**	GNK

A total of 60 trees or tree clusters are located within close proximity to Six Points Interchange. These trees are predominantly non-native ornamental tree species such as horse chestnut (*Aesculus hippocastanum*), Norway maple (*Acer platanoides*) and Carolina poplar (*Populus X canadensis*). A summary of these tree species is presented in Appendix B.

2.3.2 Flora

To date, a total of 94 vascular plant taxa have been recorded within the study area. Fifty-eight (58) taxa, 62 percent of the recorded flora, are considered introduced and non-native to Ontario. A list of vascular plants identified within the study area is presented in Table 1.

2.3.3 Species at Risk

Plant species status was reviewed for the Greater Toronto Area and the City of Toronto (Varga *et al*. 2000) and Ontario (Oldham 1999). No plant species considered rare, threatened or endangered (R,T,E) in Ontario or regionally or locally rare or uncommon were noted during field investigations.

Vegetation community status was reviewed for Ontario (NHIC 1997). The vegetation communities identified within the study area are considered widespread and common in Ontario and secure globally (NHIC 1997) and locally (City of Toronto & TRCA 2001).

2.4 Wildlife and Wildlife Habitat

Field investigations within the study area were conducted on December 17, 2003 and September 14, 2004 to document wildlife habitat and wildlife occupation and to characterize the nature, extent and significance of animal usage within the project limits. Wildlife species or their calls, tracks, scat, sign or important habitat were documented.

2.4.1 Wildlife Habitat

The study area consists of commercial, industrial and urban residential areas. The majority of the study area is open habitat of anthropogenic origin with few natural heritage features. Wildlife habitat is typical of an urban setting with species that are very tolerant of human disturbance. The most significant habitat constitutes the Dry-Moist Old Field Cultural Meadow (CUM1-1) community located to the southeast of Six Points Interchange as well as mature landscape/ornamental trees and hedgerows in the study area.

2.4.2 Fauna

To date, 15 species of birds and 11 species of mammals have been documented in the study area either through field investigations or from secondary source information. No herpetofauna were observed during field investigations. A summary of wildlife documented in the study area during field investigations and through secondary source information is presented in Table 2.

2.4.3 Species at Risk

No terrestrial wildlife species of management concern beyond the local (upper tier municipal jurisdiction) level were recorded during field investigations in the study area. One bird species, Savannah Sparrow (*Passerculus sandwichensis*), has been identified by Bird Studies Canada (BSC) as a species of conservation priority (Couturier 1999). No bird species documented within the study area have been identified by TRCA as species of concern within TRCA's jurisdiction (TRCA 2001).

No species documented in the study area are protected under the *Fish and Wildlife Conservation Act.* Twelve species of birds documented in the study area are protected under the *Migratory Birds Convention Act* (Table 2). No terrestrial wildlife listed under the *Species at Risk Act* or the *Endangered Species Act* were recorded in the study area.

TABLE 1.
WORKING VASCULAR PLANT CHECKLIST

	Scientific Name	Common Name	COSEWIC	MNR	Local	Legal Status	Location		
							CUM1-1	Lawn	Planting
	EQUISETACEAE	**HORSETAIL FAMILY**							
	Equisetum arvense	field horsetail					X		
	PINACEAE	**PINE FAMILY**							
*	*Picea abies*	Norway spruce						X	X
*	*Picea pungens*	Colorado spruce						X	X
	ULMACEAE	**ELM FAMILY**							
*	*Ulmus procera*	English elm						X	X
*	*Ulmus pumila*	Siberian elm						X	X
	JUGLANDACEAE	**WALNUT FAMILY**							
	Juglans nigra	black walnut						X	X
	CHENOPODIACEAE	**GOOSEFOOT FAMILY**							
*	*Chenopodium album*	lamb's quarters					X		
	CARYOPHYLLACEAE	**PINK FAMILY**							
*	*Silene vulgaris*	bladder campion					X		
	POLYGONACEAE	**SMARTWEED FAMILY**							
	Polygonum lapathifolium	nodding smartweed					X		
*	*Polygonum orientale*	kiss-me-over-the-garden-gate					X		
*	*Polygonum persicaria*	lady's thumb					X		
*	*Rumex crispus*	curled dock					X		
	GUTTIFERAE	**ST JOHN'S-WORT FAMILLY**							
*	*Hypericum perforatum*	common St. John's-wort					X		
	SALICACEAE	**WILLOW FAMILY**							
	Populus balsamifera	balsam poplar					X		
	Populus tremuloides	trembling aspen					X		
*	*Populus X canadensis*	Carolina poplar					X	X	X
*	*Salix x rubens*	crack willow					X	X	X
	BRASSICACEAE	**MUSTARD FAMILY**							
*	*Alliaria petiolata*	garlic mustard					X		
*	*Lepidium campestre*	field cress					X		

TABLE 1.
WORKING VASCULAR PLANT CHECKLIST

	Scientific Name	Common Name	COSEWIC	MNR	Local	Legal Status	Location		
							CUM1-1	Lawn	Planting
	ROSACEAE	**ROSE FAMILY**							
*	*Crataegus monogyna*	English hawthorn					X		
	Fragaria virginiana	wild strawberry					X		
	Geum aleppicum	yellow avens					X		
*	*Geum urbanum*	urban avens					X		
	Malus spp.	apple						X	X
*	*Potentilla argentea*	silvery cinquefoil					X	X	
*	*Potentilla recta*	rough-fruited cinquefoil					X		
	Prunus virginiana ssp. virginiana	choke cherry					X		
*	*Sorbus aucuparia*	European mountain-ash					X		
	FAGACEAE	**BEECH FAMILY**							
	Quercus rubra	red oak						X	X
	FABACEAE	**PEA FAMILY**							
*	*Medicago lupulina*	black medick					X	X	
*	*Melilotus alba*	white sweet clover					X		
*	*Robinia pseudo-acacia*	black locust						X	X
*	*Trifolium pratense*	red clover					X		
*	*Vicia cracca*	bird vetch					X		
	ELAEAGNACEAE	**OLEASTER FAMILY**							
*	*Elaeagnus angustifolia*	Russian-olive					X		
	LYTHRACEAE	**LOOSESTRIFE FAMILY**							
*	*Lythrum salicaria*	purple loosestrife					X		
	ONAGRACEAE	**EVENING-PRIMROSE**							
*	*Epilobium hirsutum*	great hairy willow-herb					X		
	Oenothera biennis	common evening primrose					X		
	CORNACEAE	**DOGWOOD FAMILY**							
	Cornus stolonifera	red-osier dogwood					X		
	RHAMNACEAE	**BUCKTHORN FAMILY**							
*	*Rhamnus cathartica*	common buckthorn					X		

TABLE 1.
WORKING VASCULAR PLANT CHECKLIST

	Scientific Name	Common Name	COSEWIC	MNR	Local	Legal Status	Location		
							CUM1-1	Lawn	Planting
	VITACEAE	**GRAPE FAMILY**							
	Parthenocissus inserta	thicket creeper					X		
	Vitis riparia	riverbank grape					X		
	HIPPOCASTANACEAE	**BUCKEYE FAMILY**							
*	*Aesculus hippocastanum*	horse-chestnut						X	X
	ACERACEAE	**MAPLE FAMILY**							
	Acer negundo	Manitoba maple					X	X	X
*	*Acer platanoides*	Norway maple						X	X
	Acer rubrum	red maple					X		
	Acer X freemanii	hybrid maple					X		
	ANACARDIACEAE	**SUMAC FAMILY**							
	Rhus typhina	staghorn sumac					X		
	APIACEAE	**PARSLEY FAMILY**							
*	*Daucus carota*	wild carrot					X		
	ASCLEPIADACEAE	**MILKWEED FAMILY**							
	Asclepias syriaca	common milkweed					X		
	SOLANACEAE	**NIGHTSHADE FAMILY**							
*	*Solanum dulcamara*	bittersweet nightshade					X		
	BORAGINACEAE	**BORAGE FAMILY**							
*	*Echium vulgare*	viper's bugloss					X		
	LAMIACEAE	**MINT FAMILY**							
*	*Glechoma hederacea*	ground ivy					X	X	
*	*Nepeta cataria*	catnip					X		
	PLANTAGINACEAE	**PLANTAIN FAMILY**							
*	*Plantago lanceolata*	lance-leaved plantain					X	X	
*	*Plantago major*	common plantain					X	X	
	OLEACEAE	**OLIVE FAMILY**							
	Fraxinus americana	white ash					X		
	Fraxinus pennsylvanica	green/red ash					X	X	X

TABLE 1.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local	Legal Status	Location		
						CUM1-1	Lawn	Planting
SCROPHULARIACEAE	**FIGWORT FAMILY**							
* *Linaria vulgaris*	butter-and-eggs					X		
* *Verbascum thapsus*	common mullein					X		
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**							
* *Lonicera tatarica*	Tartarian honeysuckle					X		
ASTERACEAE	**ASTER FAMILY**							
* *Achillea millefolium ssp. millefolium*	yarrow					X		
Ambrosia artemisiifolia	common ragweed					X	X	
* *Anthemis cotula*	stinking mayweed					X	X	
* *Arctium minus*	common burdock					X		
Aster ericoides	heath aster					X		
Aster lateriflorus	side-flowering aster					X		
Aster novae-angliae	New England aster					X		
* *Chrysanthemum leucanthemum*	ox-eye daisy					X	X	
* *Cichorium intybus*	chickory					X		
* *Cirsium arvense*	Canada thistle					X	X	
* *Cirsium vulgare*	bull-thistle					X		
Euthamia graminifolia	grass-leaved goldenrod					X		
Solidago altissima	tall goldenrod					X		
Solidago canadensis	Canada goldenrod					X		
* *Tanacetum vulgare*	garden tansy					X		
* *Taraxacum officinale*	common dandelion					X	X	
* *Tragopogon dubius*	goat's beard					X		
CYPERACEAE	**SEDGE FAMILY**							
Cyperus esculentus	chufa					X		
POACEAE	**GRASS FAMILY**							
Agrostis stolonifera	creeping bent grass					X		
* *Avena fatua*	wild oats					X		
* *Bromus inermis ssp. inermis*	smooth brome					X		

TABLE 1.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local	Legal Status	Location		
						CUM1-1	Lawn	Planting
* *Bromus tectorum*	downy brome					X		
* *Echinochloa crusgalli*	barnyard grass					X	X	
* *Elymus repens*	quack grass					X	X	
* *Festuca rubra ssp. rubra*	red fescue					X		
* *Hordeum jubatum ssp. jubatum*	squirrel-tail grass					X		
Panicum capillare	witch grass					X		
* *Phleum pratense*	timothy					X		
Phragmites australis	common reed					X		
Poa compressa	Canada bluegrass					X	X	
Poa pratensis ssp. pratensis	Kentucky bluegrass					X	X	
TYPHACEAE	**CATTAIL FAMILY**							
Typha latifolia	common cattail					X		
LILIACEAE	**LILY FAMILY**							
* *Convallaria majalis*	lily-of-the-valley					X		

COSEWIC – Committee on the Status of Endangered Wildlife in Canada:
- END – Endangered
- THR – Threatened
- SC – Special Concern

Local:
- C – Toronto and Region Conservation Authority Species of Concern

OMNR – Ontario Ministry of Natural Resources:
- END – Endangered
- THR – Threatened
- VUL – Vulnerable

Legal Status:
- SARA – Species at Risk Act
- ESA – Endangered Species Act

TABLE 2.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA BY LGL AND OTHERS

Wildlife	Scientific Name	Common Name	COSEWIC	MNR	Local	Legal Status	Secondary Sources	Field Observations
Birds	*Larus delawarensis*	Ring-billed Gull				MBCA		X
	Branta canadensis	Canada Goose				MBCA	X	
	Charadrius vociferus	Killdeer				MBCA	X	
	Columba livia	Rock Pigeon						X
	Zenaida macroura	Mourning Dove				MBCA		X
	Picoides pubescens	Downy Woodpecker				MBCA		X
	Sturnus vulgaris	Starling						X
	Carpodacus mexicanus	House Finch				MBCA	X	
	Carduelis tristis	American Goldfinch				MBCA	X	
	Passerculus sandwichensis	Savannah Sparrow			BSC	MBCA	X	
	Spizella passerina	Chipping Sparrow				MBCA	X	
	Melospiza melodia	Song Sparrow				MBCA		X
	Cardinalis cardinalis	Northern Cardinal				MBCA	X	
	Passer domesticus	House Sparrow						X
	Turdus migratorius	American Robin				MBCA		X
Mammals	*Blarina brevicauda*	N. Short-tailed Shrew					X	
	Sylvilagus floridanus	Eastern Cottontail					X	
	Sciurus carolinensis	Gray Squirrel					X	
	Marmota monax	Woodchuck						X
	Microtus pennsylvanicus	Meadow Vole					X	
	Peromyscus leucopus	White-footed Mouse						X
	Mephitis mephitis	Striped Skunk					X	
	Procyon lotor	Raccoon						X
	Vulpes vulpes	Red Fox					X	
	Canis latrans	Coyote					X	
	Odocoileus virginianus	White-tailed Deer					X	

COSEWIC – Committee on the Status of Endangered Wildlife in Canada:
- END – Endangered
- THR – Threatened
- SC – Special Concern

Local:
- BSC – Bird Studies Canada Species of Conservation Priority
- C – Toronto and Region Conservation Authority Species of Concern

OMNR – Ontario Ministry of Natural Resources:
- END – Endangered
- THR – Threatened
- VUL – Vulnerable

Legal Status:
- MBCA - Migratory Birds Convention Act
- SARA – Species at Risk Act
- ESA – Endangered Species Act
- FWCA – Fish and Wildlife Conservation Act (P) Protected Species (G) Game Species

2.5 Designated Natural Areas

Designated natural areas include areas identified for protection by the OMNR, TRCA and upper and lower tier municipalities. There are no Environmentally Significant/Sensitive Areas (ESAs), Significant Wetlands or Areas of Natural and Scientific Interest (ANSIs) within or adjacent to the study area.

2.5.1 Natural Corridors

The railway line and a hydro corridor to the northwest of the study area act as corridors/wildlife pathways for wildlife tolerant of an urban environment and may serve to link locally important habitat units for

wildlife occupants. These areas allow for wildlife movement to and from more protected areas associated with Mimico Creek to the northeast of the study area. The study area is highly urbanized and very few natural areas are linked together.

2.5.2 Natural Heritage System

According to the City of Toronto Official Plan there are no Natural Areas within the study area. Prior to its removal, the previously treed area located south of Dundas Street West and west of Kipling Avenue was designated a Natural Area.

3.0 PROJECT DESCRIPTION

The project is centred around the interchange where Dundas Street West, Kipling Avenue and Bloor Street West converge, and is known as the Six Points Interchange. The study area is bounded by Shorncliffe Road/Shaver Road to the west, Royal York Road to the east, Burnhamthorpe Road to the north and North Queen Street and Norseman Street to the south, in the City of Toronto.

The City of Toronto has retained iTRANS Consulting to conduct the Class Environmental Assessment for the Six Points Interchange to examine options for reconfigurating the interchange and to recommend a preferred design that is consistent with the policy objectives of the new Etobicoke Centre Secondary Plan.

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

4.1 Physiography and Soils

Clay loam soils located within the project limits have slight susceptibility to erosion. However, soil disturbance associated with excavations, cut and fill, drainage alterations, etc. may result in erosion of, and sedimentation to, sensitive receiving watercourses. Site-specific erosion and sedimentation control measures to be implemented prior to construction will be identified during detail design. Erosion and sedimentation control measures will include:

- limiting the geographical extent and duration that soils are exposed to the elements;
- implementing standard erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 577 including: straw bale and/or rock flow checks placed at regular intervals in ditches down gradient from areas of soil disturbance; silt fence placed within ditches and around catch basins in areas of soil disturbance; applying conventional seed and mulch, tackifiers and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; etc.; and,
- managing surface water outside of work areas to prevent surface water from coming in contact with exposed soils.

Monitoring of erosion and sedimentation control measures during construction will be implemented to ensure their effectiveness. These environmental protection measures will greatly reduce the potential for soil erosion and impairment of water quality.

4.2 Aquatic Habitats and Communities

There are no watercourses located within the project limits.

4.2.1 Changes to Water Quality and Quantity

The reconfiguration of Six Point Interchange has the potential to alter water quality and quantity by reducing the permeability of the ground resulting in increased runoff of surface water. An increase in runoff may promote sedimentation into local catch basins.

4.2.2 Changes in Water Temperature

During detail design, a stormwater management plan will be prepared to address treatment of surface water runoff. Methods used to reduce the temperature of runoff such as infiltration trenches and perforated storm sewers will be investigated.

4.3 Vegetation and Vegetation Communities

The reconfiguration of Six Points Interchange has the potential to result in the displacement of and disturbance to vegetation and vegetation communities. Effects on vegetation related to the reconfiguration may include:

- displacement of vegetation and vegetation communities;
- drainage modifications and salt spray; and,
- displacement of rare, threatened or endangered vegetation or significant vegetation communities.

Over time these disturbances may alter community structure, composition and function. Effects are most prominent in areas that have not been previously disturbed.

4.3.1 Displacement of Vegetation and Vegetation Communities

Minor clearing will be required, primarily within the existing right-of-way, for the reconfiguration of Six Points Interchange. The right-of-way vegetation is primarily ornamental plantings and hedgerows. Urban vegetation provides habitat for birds and small mammals, shade, soil stabilization, and carbon cycling through respiration. For this reason, efforts should be made to protect urban vegetation that does not need to be removed for the interchange reconfiguration.

Encroachment on existing vegetation communities located adjacent to the right-of-way will occur in one location: the Dry-Moist Old Field Cultural Meadow (CUM1-1) located to the southeast of Six Points Interchange. The reconfiguration of the interchange will result in the removal of approximately 0.5 ha of this community. This area is already scheduled for development; therefore, this CUM1-1 will be lost regardless of whether the interchange is reconfigured or not.

In addition, a number of planted/ornamental trees will be affected by the reconfiguration of the interchange. A list of trees that could potentially be affected by the reconfiguration of Six Points Interchange is presented in Appendix B and their approximate location is shown in Figure 2.

The following environmental protection measures designed to reduce vegetation removals will be considered on a site-specific basis during detail design:

- reduce the area of the footprint to the extent possible through the use of retaining walls, urban cross-sections and other road design elements;
- reduce grading requirements to the extent possible to maintain existing drainage patterns;
- provide local tree protection including guiderails, retaining walls and ditches where warranted;

- identify and protect trees to be retained during construction using a temporary tree protection barrier in accordance with OPSS 565; and,
- plant new native vegetation to compensate for vegetation removals.

4.3.2 Disturbance to Vegetation and Vegetation Communities

Disturbance to vegetation as a result the reconfiguration of Six Points Interchange is considered negligible since the majority of the vegetation located adjacent to the right-of-way has been previously disturbed by urban development. Impacts on vegetation communities will likely be due to grading activities rather than the need to clear portions of or entire communities.

The effects of salt spray on vegetation are considered minor and unavoidable due to safety concerns. Vegetation dieback is typically limited to the outermost edge of vegetation communities and varies based on the orientation of the transportation corridor, the direction of the prevailing winds, the frequency and volume of salt applied, and the sensitivity of the receiving vegetation to salt. Measures to reduce potential impacts of road salt include:

- manage the application of road salt through judicious timing, improved spreader machinery, pre-wetting methods, pavement temperature monitoring, and other techniques; and,
- use alternative substances to de-icing salt including other chloride salts, and acetate-based substances, where appropriate.

These measures will keep vegetation dieback to a minimum.

4.3.3 Displacement of Rare, Threatened or Endangered Vegetation or Significant Vegetation Communities

No rare, threatened or endangered vegetation or significant vegetation communities will be affected by this project.

4.4 Wildlife and Wildlife Habitat

The reconfiguration of Six Points Interchange has the potential to result in the displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to the reconfiguration include:

- displacement of wildlife and wildlife habitat;
- barrier effects on wildlife passage;
- wildlife/vehicle conflicts;
- disturbance to wildlife from noise, light and visual intrusion; and,
- displacement of rare, threatened or endangered wildlife and significant wildlife habitat.

Effects are most prominent in areas that have not been previously disturbed.

4.4.1 Displacement of Wildlife and Wildlife Habitat

The reconfiguration of Six Points Interchange will be constructed primarily within the existing right-of-way with several exceptions. The right-of-way consists primarily of previously modified/disturbed terrestrial wildlife habitat with low habitat structure and diversity and limited habitat capability. Consequently, the development of the bus only lanes will have no significant effect on wildlife and wildlife habitat.

Numerous bird species located within the project limits are listed under the *Migratory Birds Convention Act* (MBCA). The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round (migratory game birds are only protected from March 10 to September 1), permits are seldom secured and the *Act* is seldom enforced for removal of wildlife habitat outside of the nesting season. To meet the requirements of the MBCA, no vegetation removals should occur during the nesting season. With several exceptions, this includes the period from April 1 to July 31. If vegetation clearing is required during this period, a nesting survey should be carried out by a qualified avian biologist prior to construction. If active nests are found, a site-specific mitigation plan should be prepared in consultation with the Canadian Wildlife Service.

4.4.2 Barrier Effects on Wildlife Passage

No new barriers to wildlife passage will be created as a result of the reconfiguration of Six Points Interchange. Given the urban nature of the study area, the reconfiguration will have no significant impact on wildlife passage.

4.4.3 Wildlife/Vehicle Conflicts

The addition of new lanes to Dundas Street West and Bloor Street West will increase the width of the traveled surface resulting in a potential increased risk of mortality for wildlife that elects to cross the road. Given the urban nature of the study area, the increase in road width will have no significant impact on wildlife/vehicle conflicts.

4.4.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In urban settings, such as the study area, wildlife have become acclimatized to the urban conditions and only those fauna that are tolerant of human activities remain. Given the extent of urbanization in the study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the reconfiguration of Six Points Interchange, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effects.

4.4.5 Displacement of Rare, Threatened or Endangered Wildlife or Significant Wildlife Habitat

No rare, threatened or endangered wildlife or significant wildlife habitat will be affected by this project.

5.0 MONITORING

During construction, a site supervisor for the contract administrator will be responsible for delineating work areas and ensuring that erosion and sedimentation control measures are functional. City of Toronto Parks staff will inspect landscape plantings following construction to ensure their survival.

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APPENDIX A
PHOTOGRAPHIC RECORD

PROJECT #TA2985
DECEMBER 2003

PHOTO APPENDIX

Facing northeast on Dundas Street towards Six Points Interchange.

Facing southeast from Dundas Street towards new development that has replaced a Cultural Woodland (CUW) community.

Facing northwest towards Dundas Street along Dundas Street eastbound off ramp, west of Kipling Avenue.

Facing southeast towards open area adjacent to rail tracks, east of Kipling Avenue and south of Six Points Interchange.

Facing northwest towards Six Points Interchange from the Kipling Avenue northbound ramp, east of Kipling Avenue.

Facing west towards Six Points Interchange along Dundas Street eastbound ramp to Bloor Street.

PROJECT #TA2985
DECEMBER 2003

PHOTO APPENDIX

Facing east along the Dundas Street eastbound ramp to Bloor Street.

Facing southwest towards Six Points Interchange along Dundas Street.

Facing southeast from Kipling Avenue towards Dundas Street-Kipling Avenue ramps north of Six Points Interchange.

Facing south along Kipling Avenue towards Six Point Interchange and the Dundas Street overpass of Kipling Avenue.

Facing north along Kipling Avenue from the Dundas Street overpass of Kipling Avenue.

Facing southeast along Bloor Street towards Six Points Interchange.

APPENDIX B
TREE INVENTORY SUMMARY TABLE

APPENDIX B.
TREE INVENTORY SUMMARY TABLE

#	Species	D.B.H.	Condition	Position	Comments
1	black walnut (*Juglans nigra*)	39	Good	Open Grown	
2	black walnut	39	Good	Open Grown	
3	apple (*Malus* spp.)	20	Poor-Fair	Open Grown	
4	Norway maple (*Acer platanoides*)	34	Poor-Fair	Open Grown	Dieback
5	red oak (*Quercus rubra*)	33	Good	Open Grown	
6	Carolina poplar (*Populus X canadensis*)	50	Poor-Fair	Open Grown	Four main trunks, dieback
7	black locust (*Robinia pseudo-acacia*)	5-30	Good	Co-dominant	Approximately 16 clusters of multi-stemmed trees/shrubs
8	Carolina poplar	28	Good	Open Grown	Two main trunks
9	Manitoba maple (*Acer negundo*)	30	Fair	Open Grown	Three main trunks, vine covered, dieback
10	Siberian elm (*Ulmus pumila*)	25	Fair	Open Grown	Two main trunks, dieback
11	Norway maple	86	Good	Open Grown	Measured below major branching of trunk
12	Siberian elm	50	Fair-Good	Open Grown	Two main trunks, decaying peeled bark
13	green ash (*Fraxinus pennsylvanica*)	50	Good	Open Grown	Two main trunks
14	green ash	46	Poor	Open Grown	Major dieback
15	Norway maple	66	Good	Open Grown	
16	crack willow (*Salix X rubens*)	43-61	Good	Co-dominant	Grove of four trees
17	Norway maple	31	Good	Open Grown	
18	horse chestnut (*Aesculus hippocastanum*)	56	Good	Open Grown	
19	horse chestnut	62	Good	Open Grown	
20	horse chestnut	36	Good	Open Grown	
21	horse chestnut	45	Good	Open Grown	
22	horse chestnut	37	Good	Open Grown	
23	Norway maple	35	Good	Open Grown	
24	horse chestnut	48	Good	Open Grown	
25	English elm (*Ulmus procera*)	89	Good	Open Grown	
26	Norway maple	31	Fair-Good	Open Grown	
27	black locust	30	Good	Open Grown	Three main trunks
28	Norway maple	43	Good	Open Grown	
29	black locust	25	Good	Open Grown	Multi-stemmed
30	Norway maple	38	Good	Open Grown	
31	Norway maple	36	Good	Open Grown	
32	apple	16	Poor-Fair	Open Grown	
33	Norway maple	16	Good	Open Grown	
34	horse chestnut	69	Good	Open Grown	
35	Norway maple	15-23	Good	Open Grown	Hedge of 6 trees
36	Carolina poplar	85	Poor-Fair	Open Grown	Dieback
37	Norway maple	28	Good	Open Grown	

APPENDIX B.
TREE INVENTORY SUMMARY TABLE

#	Species	D.B.H.	Condition	Position	Comments
38	Siberian elm	50	Good	Open Grown	
39	Manitoba maple	20	Good	Open Grown	Multi-stemmed
40	Norway maple	65	Good	Open Grown	One tee on a residential lawn
41	Norway maple	30-35	Good	Open Grown	Two trees on a residential lawn
42	Norway spruce (*Picea abies*)	30	Good	Open Grown	One tree on a residential lawn
43	Norway maple	25	Good	Open Grown	
44	Norway maple	31	Good	Open Grown	
45	Norway maple	39	Good	Open Grown	
46	Norway maple	76	Good	Open Grown	Measured below major branching of trunk
47	Siberian elm	60	Good	Open Grown	
48	Siberian elm	10-15	Good	Open Grown	Three clusters of small trees
49	green ash	15-40	Good	Open Grown	Hedge of 32 green ash trees
50	Siberian elm	26	Good	Open Grown	
51	Manitoba maple	19	Good	Open Grown	
52	green ash	30	Fair-Good	Open Grown	
53	Carolina poplar	53	Good	Open Grown	
54	Carolina poplar	32	Good	Open Grown	
55	Carolina poplar	26	Good	Open Grown	
56	green ash	30	Good	Open Grown	
57	green ash	15	Good	Open Grown	
58	Siberian elm	25	Good	Open Grown	
59	Manitoba maple	50	Good	Open Grown	
60	green ash	35	Fair-Good	Open Grown	

Appendix G
Cost Estimates

SUMMARY SHEET - DUNDAS LOOP (With Utilities)

ITEM DESCRIPTION	QUANTITY	START STATION	END STATION	UNIT	QUANTITY	CURRENT UNIT PRICE	COST
ASPHALT PAVEMENT 115 mm DEPTH (Sqm)	61551			tonnes	18050	$80	$1,443,975
CONCRETE BASE 250 mm DEPTH (Sqm)	65000			Cum	16250	$250	$4,062,500
GRANULAR A SUB-BASE 150 mm DEPTH (sqm)	65000			tonnes	23400	$20	$468,000
GRANULAR B SUB-BASE 450 mm DEPTH (sqm)	86800			tonnes	78120	$15	$1,171,800
3 M PAVED AREA - 515 mm DEPTH of Granular A (Sqm)	20700			tonnes	25585	$20	$511,704
SIDEWALK (Sqm)	10900			Sqm	10900	$60	$654,000
CURB & GUTTER (m)	7265			m	7265	$60	$435,900
EXCAVATION (Sqm)	1085			Cum	19979	$10	$199,785
BORROW (Sqm)	1850			Cum	41468	$11	$456,148
TRAFFIC SIGNALS (each)	5			each	5	$250,000	$1,250,000
EXISTING ROAD REMOVAL						LUMP SUM	$3,370,000
						MAJOR ITEMS TOTAL COST	$14,023,812
TRAFFIC MANAGEMENT AND DETOURS						20% OF MAJOR ITEM TOTAL COST	$2,804,762
ENGINEERING & CONTINGENCIES						30% OF MAJOR ITEM TOTAL COST	$4,207,144
DRAINAGE						25% OF MAJOR ITEM TOTAL COST	$3,505,953
ELECTRICAL						35% OF MAJOR ITEM TOTAL COST	$4,908,334
UTILITY RELOCATION						LUMP SUM	$4,600,000
						Enbridge:	$50,000
						Bell:	$4,500,000
						Rogers:	$50,000
G.S.T (6%)							$2,043,000
						ESTIMATED TOTAL COST	$36,093,005