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London Fenchurch Street	d	**20 19**	**20 25**	**20 34**	**20 41**	**20 49**	**20 55**	**21 04**	**21 11**	**21 19**	**21 25**	**21 34**	**21 41**	**21 49**	**21 55**	**22 04**	**22 11**	**22 19**	**22 25**	**22 41**	**22 49**	**22 55**	**23 04**	**23 11**	**23 19**	**23 25**	**23 41**	**23 49**	**23 55**	**00 11**
Limehouse		**20 23**	**20 29**	**20 38**	**20 45**	**20 53**	**20 59**	**21 08**	**21 15**	**21 23**	**21 29**	**21 38**	**21 45**	**21 53**	**21 59**	**22 08**	**22 15**	**22 23**	**22 29**	**22 45**	**22 53**	**22 59**	**23 08**	**23 15**	**23 23**	**23 29**	**23 45**	**23 53**	**23 59**	**00 15**
West Ham		**20 28**	**20 34**	**20 43**	**20 50**	**20 58**	**21 04**	**21 13**	**21 20**	**21 28**	**21 34**	**21 43**	**21 50**	**21 58**	**22 04**	**22 13**	**22 20**	**22 28**	**22 34**	**22 50**	**22 58**	**23 04**	**23 13**	**23 20**	**23 28**	**23 34**	**23 50**	**23 58**	**00 04**	**00 20**
London Liverpool Street	d	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barking		**20 33**	**20 39**	**20 48**	**20 55**	**21 03**	**21 09**	**21 18**	**21 25**	**21 33**	**21 39**	**21 48**	**21 55**	**22 03**	**22 09**	**22 18**	**22 25**	**22 33**	**22 39**	**22 55**	**23 03**	**23 09**	**23 18**	**23 25**	**23 33**	**23 39**	**23 55**	**00 03**	**00 09**	**00 25**
Upminster		**20 41**	.....	**20 56**	**21 03**	**21 11**	.....	**21 26**	**21 33**	**21 41**	.....	**21 56**	**22 03**	**22 11**	.....	**22 26**	**22 33**	**22 41**	.....	**23 03**	**23 11**	.....	**23 26**	**23 33**	**23 41**	.....	**00 03**	**00 11**	.....	**00 33**
Ockendon		.....	.....	.....	**21 09**	.....	.....	.....	**21 39**	.....	.....	.....	**22 09**	.....	.....	.....	**22 39**	.....	.....	**23 09**	.....	.....	.....	**23 39**	.....	.....	**00 09**	.....	.....	**00 39**
Chafford Hundred (Lakeside)		.....	.....	.....	**21 13**	.....	.....	.....	**21 43**	.....	.....	.....	**22 13**	.....	.....	.....	**22 43**	.....	.....	**23 13**	.....	.....	.....	**23 43**	.....	.....	**00 13**	.....	.....	**00 42**
Dagenham Dock		.....	**20 44**	.....	.....	.....	**21 14**	.....	.....	.....	**21 44**	.....	.....	.....	**22 14**	.....	.....	.....	**22 44**	.....	.....	**23 14**	.....	.....	.....	**23 44**	.....	.....	**00 14**	.....
Rainham		.....	**20 47**	.....	.....	.....	**21 17**	.....	.....	.....	**21 47**	.....	.....	.....	**22 17**	.....	.....	.....	**22 47**	.....	.....	**23 17**	.....	.....	.....	**23 47**	.....	.....	**00 17**	.....
Purfleet		.....	**20 52**	.....	.....	.....	**21 22**	.....	.....	.....	**21 52**	.....	.....	.....	**22 22**	.....	.....	.....	**22 52**	.....	.....	**23 22**	.....	.....	.....	**23 52**	.....	.....	**00 22**	.....
Grays		.....	**20 59**	.....	**21 17**	.....	**21 29**	.....	**21 47**	.....	**21 59**	.....	**22 17**	.....	**22 29**	.....	**22 47**	.....	**22 59**	**23 17**	.....	**23 29**	.....	**23 47**	.....	**23 59**	**00 17**	.....	**00 29**	**00 46**
Tilbury Town		.....	.....	.....	**21 20**	.....	.....	.....	**21 50**	.....	.....	.....	**22 20**	.....	.....	.....	**22 50**	.....	.....	**23 20**	.....	.....	.....	**23 50**	.....	.....	**00 20**	.....	.....	**00 49**
East Tilbury		.....	.....	.....	**21 26**	.....	.....	.....	**21 56**	.....	.....	.....	**22 26**	.....	.....	.....	**22 56**	.....	.....	**23 26**	.....	.....	.....	**23 56**	.....	.....	**00 26**	.....	.....	**00 55**
Stanford-le-Hope		.....	.....	.....	**21 30**	.....	.....	.....	**22 00**	.....	.....	.....	**22 30**	.....	.....	.....	**23 00**	.....	.....	**23 30**	.....	.....	.....	**23 59**	.....	.....	**00 30**	.....	.....	**00 59**
West Horndon		.....	.....	**21 01**	.....	.....	.....	**21 31**	.....	.....	.....	**22 01**	.....	.....	.....	**22 31**	.....	**22 46**	.....	.....	**23 16**	.....	**23 31**	.....	**23 46**	.....	.....	**00 16**	.....	.....
Laindon		**20 49**	.....	**21 06**	.....	**21 19**	.....	**21 36**	.....	**21 49**	.....	**22 06**	.....	**22 19**	.....	**22 36**	.....	**22 51**	.....	.....	**23 21**	.....	**23 36**	.....	**23 51**	.....	.....	**00 21**	.....	.....
Basildon		**20 52**	.....	**21 09**	.....	**21 22**	.....	**21 39**	.....	**21 52**	.....	**22 09**	.....	**22 22**	.....	**22 39**	.....	**22 54**	.....	.....	**23 24**	.....	**23 39**	.....	**23 54**	.....	.....	**00 24**	.....	.....
Pitsea		.....	.....	**21 12**	**21 38**	.....	.....	**21 42**	**22 08**	.....	.....	**22 12**	**22 38**	.....	.....	**22 42**	**23 08**	**22 57**	.....	**23 38**	**23 27**	.....	**23 42**	**00 08**	**23 57**	.....	**00 38**	**00 27**	.....	**01 07**
Benfleet		**20 58**	.....	**21 16**	**21 42**	**21 28**	.....	**21 46**	**22 12**	**21 58**	.....	**22 16**	**22 42**	**22 28**	.....	**22 46**	**23 12**	**23 01**	.....	**23 42**	**23 31**	.....	**23 46**	**00 12**	**00 01**	.....	**00 42**	**00 31**	.....	**01 11**
Leigh-on-Sea		**21 02**	.....	**21 20**	**21 46**	**21 32**	.....	**21 50**	**22 16**	**22 02**	.....	**22 20**	**22 46**	**22 32**	.....	**22 50**	**23 16**	**23 05**	.....	**23 46**	**23 35**	.....	**23 50**	**00 16**	**00 05**	.....	**00 46**	**00 35**	.....	**01 15**
Chalkwell		**21 05**	.....	**21 23**	**21 49**	**21 35**	.....	**21 53**	**22 19**	**22 05**	.....	**22 23**	**22 49**	**22 35**	.....	**22 53**	**23 19**	**23 08**	.....	**23 49**	**23 38**	.....	**23 53**	**00 19**	**00 08**	.....	**00 49**	**00 38**	.....	**01 18**
Westcliff		**21 07**	.....	**21 25**	**21 51**	**21 37**	.....	**21 55**	**22 21**	**22 07**	.....	**22 25**	**22 51**	**22 37**	.....	**22 55**	**23 21**	**23 10**	.....	**23 51**	**23 40**	.....	**23 55**	**00 21**	**00 10**	.....	**00 51**	**00 40**	.....	**01 20**
Southend Central	a	**21 09**	.....	**21 27**	**21 55**	**21 39**	.....	**21 57**	**22 25**	**22 09**	.....	**22 27**	**22 55**	**22 39**	.....	**22 57**	**23 23**	**23 12**	.....	**23 54**	**23 42**	.....	**23 57**	**00 23**	**00 12**	.....	**00 53**	**00 42**	.....	**01 22**
Southend Central	d	**21 10**	.....	**21 28**	.....	**21 40**	.....	**21 58**	.....	**22 10**	.....	**22 28**	.....	**22 40**	.....	**22 58**	**23 24**	**23 13**	.....	**23 54**	**23 43**	.....	**23 58**	**00 23**	**00 13**	.....	**00 53**	**00 43**	.....	**01 22**
Southend East		**21 12**	.....	**21 30**	.....	**21 42**	.....	**22 00**	.....	**22 12**	.....	**22 30**	.....	**22 42**	.....	**23 00**	**23 26**	**23 15**	.....	**23 56**	**23 45**	.....	**23 59**	**00 25**	**00 15**	.....	**00 55**	**00 45**	.....	**01 24**
Thorpe Bay		**21 14**	.....	**21 32**	.....	**21 44**	.....	**22 02**	.....	**22 14**	.....	**22 32**	.....	**22 44**	.....	**23 02**	**23 28**	**23 17**	.....	**23 58**	**23 47**	.....	**00 02**	**00 28**	**00 17**	.....	**00 58**	**00 47**	.....	**01 27**
Shoeburyness	a	**21 19**	.....	**21 37**	.....	**21 49**	.....	**22 07**	.....	**22 19**	.....	**22 37**	.....	**22 49**	.....	**23 07**	**23 32**	**23 22**	.....	**00 03**	**23 52**	.....	**00 07**	**00 32**	**00 22**	.....	**01 02**	**00 52**	.....	**01 31**

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London Fenchurch Street	d	**00 19**	**00 25**	**00 34**
Limehouse		**00 23**	**00 29**	**00 38**
West Ham		**00 28**	**00 34**	**00 43**
London Liverpool Street	d	.....	.....	.....
Stratford		.....	.....	.....
Barking		**00 33**	**00 39**	**00 49**
Upminster		**00 41**	.....	**00 57**
Ockendon		.....	.....	.....
Chafford Hundred (Lakeside)		.....	.....	.....
Dagenham Dock		.....	**00 44**	.....
Rainham		.....	**00 47**	.....
Purfleet		.....	**00 52**	.....
Grays		.....	**00 59**	.....
Tilbury Town		.....	.....	.....
East Tilbury		.....	.....	.....
Stanford-le-Hope		.....	.....	.....
West Horndon		**00 46**	.....	**01 02**
Laindon		**00 51**	.....	**01 07**
Basildon		**00 54**	.....	**01 10**
Pitsea		**00 57**	.....	**01 13**
Benfleet		**01 01**	.....	**01 17**
Leigh-on-Sea		**01 05**	.....	**01 21**
Chalkwell		**01 08**	.....	**01 24**
Westcliff		**01 10**	.....	**01 26**
Southend Central	a	**01 12**	.....	**01 28**
Southend Central	d	**01 13**	.....	**01 29**
Southend East		**01 15**	.....	**01 31**
Thorpe Bay		**01 17**	.....	**01 33**
Shoeburyness	a	**01 22**	.....	**01 38**

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Shoeburyness	d	.....	**04 17**	.....	.....	.....	**04 59**	.....	**05 13**	.....	.....	.....	**05 29**	.....	**05 37**	**05 45**	.....	.....	**05 56**	.....	.....	**06 11**	.....	.....	.....	**06 26**	.....	.....	.....	.....
Thorpe Bay		**04 07**	**04 20**	.....	**04 37**	.....	**05 03**	**05 07**	**05 17**	.....	.....	.....	**05 33**	**05 37**	**05 41**	**05 49**	.....	**05 55**	**05 59**	.....	**06 10**	**06 14**	.....	.....	.....	**06 29**	**06 38**	.....	.....	.....
Southend East		**04 09**	**04 23**	.....	**04 39**	.....	**05 05**	**05 09**	**05 19**	.....	.....	.....	**05 35**	**05 39**	**05 43**	**05 51**	.....	**05 57**	**06 02**	.....	**06 12**	**06 17**	.....	.....	.....	**06 32**	**06 40**	.....	.....	.....
Southend Central	a	**04 12**	**04 25**	.....	**04 42**	.....	**05 08**	**05 12**	**05 22**	.....	.....	.....	**05 38**	**05 42**	**05 46**	**05 54**	.....	**06 00**	**06 04**	.....	.....	**06 19**	.....	.....	.....	**06 34**	.....	.....	.....	.....
Southend Central	d	**04 12**	**04 26**	.....	**04 42**	.....	**05 08**	**05 12**	**05 22**	.....	.....	.....	**05 38**	**05 42**	**05 46**	**05 54**	.....	**06 00**	**06 05**	**06 11**	.....	**06 20**	.....	.....	.....	**06 35**	.....	.....	.....	**06 45**
Westcliff		**04 15**	**04 28**	.....	**04 45**	.....	**05 10**	**05 15**	**05 24**	.....	.....	.....	**05 40**	**05 44**	**05 48**	**05 56**	.....	**06 02**	**06 07**	**06 13**	.....	**06 22**	.....	.....	.....	**06 37**	.....	.....	.....	**06 48**
Chalkwell		**04 17**	**04 30**	.....	**04 47**	.....	**05 13**	**05 17**	**05 27**	.....	.....	.....	**05 43**	**05 47**	**05 51**	**05 59**	.....	**06 05**	**06 09**	**06 16**	.....	**06 24**	.....	.....	.....	**06 39**	.....	.....	.....	**06 50**
Leigh-on-Sea		**04 20**	**04 33**	.....	**04 50**	.....	**05 15**	**05 20**	**05 30**	.....	.....	.....	**05 45**	**05 49**	**05 53**	**06 01**	.....	**06 07**	**06 12**	**06 18**	**06 22**	**06 27**	**06 36**	.....	.....	**06 42**	**06 47**	.....	.....	**06 53**
Benfleet		**04 24**	**04 37**	.....	**04 54**	.....	**05 20**	**05 24**	**05 35**	.....	.....	.....	**05 50**	**05 54**	**05 58**	**06 06**	.....	**06 12**	**06 17**	**06 23**	**06 27**	**06 32**	**06 41**	.....	.....	**06 47**	**06 52**	.....	.....	**06 57**
Pitsea		**04 28**	**04 41**	.....	**04 58**	.....	**05 23**	**05 28**	**05 38**	.....	.....	.....	**05 53**	**06 04**	.....	**06 09**	.....	**06 19**	**06 21**	**06 29**	**06 31**	**06 36**	.....	.....	**06 42**	**06 51**	.....	.....	.....	**07 04**
Basildon		.....	**04 44**	.....	.....	.....	**05 27**	.....	**05 42**	.....	.....	.....	**05 57**	.....	**06 03**	**06 13**	.....	.....	**06 25**	.....	**06 35**	**06 40**	**06 47**	.....	.....	**06 55**	**06 58**	.....	.....	.....
Laindon		.....	**04 47**	.....	.....	.....	**05 30**	.....	**05 45**	.....	.....	.....	**06 00**	.....	**06 06**	**06 16**	.....	.....	**06 28**	.....	.....	**06 43**	.....	.....	.....	**06 58**	**07 01**	.....	.....	.....
West Horndon		.....	**04 52**	.....	.....	.....	**05 34**	.....	**05 49**	.....	.....	.....	**06 04**	.....	.....	**06 20**	.....	.....	**06 33**	.....	.....	**06 48**	.....	.....	.....	**07 03**	.....	.....	.....	.....
Stanford-le-Hope		**04 34**	.....	.....	**05 04**	.....	.....	**05 34**	.....	.....	.....	.....	.....	**06 10**	.....	.....	.....	**06 25**	.....	**06 35**	.....	.....	.....	.....	**06 48**	.....	.....	.....	.....	**07 10**
East Tilbury		**04 37**	.....	.....	**05 07**	.....	.....	**05 37**	.....	.....	.....	.....	.....	**06 14**	.....	.....	.....	**06 29**	.....	**06 38**	.....	.....	.....	.....	**06 52**	.....	.....	.....	.....	**07 14**
Tilbury Town		**04 43**	.....	.....	**05 13**	.....	.....	**05 43**	.....	.....	.....	.....	.....	**06 20**	.....	.....	.....	**06 35**	.....	**06 44**	.....	.....	.....	.....	**06 58**	.....	.....	.....	.....	**07 20**
Grays		**04 46**	.....	**04 53**	**05 16**	**05 23**	.....	**05 46**	.....	**05 53**	**06 06**	**06 14**	.....	**06 23**	.....	.....	**06 32**	**06 38**	.....	**06 48**	.....	.....	.....	**06 53**	**07 01**	.....	.....	**07 02**	**07 17**	**07 23**
Purfleet		.....	.....	**04 59**	.....	**05 29**	.....	.....	.....	**05 59**	**06 13**	.....	.....	**06 29**	.....	.....	.....	**06 44**	.....	.....	.....	.....	.....	**06 59**	**07 07**	.....	.....	.....	.....	**07 29**
Rainham		.....	.....	**05 04**	.....	**05 34**	.....	.....	.....	**06 04**	**06 19**	.....	.....	**06 34**	.....	.....	.....	**06 49**	.....	.....	.....	.....	.....	**07 04**	**07 12**	.....	.....	.....	.....	**07 34**
Dagenham Dock		.....	.....	**05 07**	.....	**05 37**	.....	.....	.....	**06 08**	**06 22**	.....	.....	**06 38**	.....	.....	.....	**06 53**	.....	.....	.....	.....	.....	**07 08**	**07 16**	.....	.....	.....	.....	**07 38**
Chafford Hundred (Lakeside)		**04 50**	.....	.....	**05 20**	.....	.....	**05 50**	.....	.....	.....	**06 18**	.....	.....	.....	.....	**06 36**	.....	.....	**06 51**	.....	.....	.....	.....	.....	.....	.....	**07 06**	**07 21**	.....
Ockendon		**04 54**	.....	.....	**05 24**	.....	.....	**05 54**	.....	.....	.....	**06 23**	.....	.....	.....	.....	**06 40**	.....	.....	**06 56**	.....	.....	.....	.....	.....	.....	.....	**07 11**	**07 26**	.....
Upminster		**05 00**	**04 57**	.....	**05 30**	.....	**05 39**	**06 00**	**05 54**	.....	.....	**06 30**	**06 09**	.....	**06 15**	**06 25**	**06 48**	.....	**06 38**	**07 03**	.....	**06 53**	.....	.....	.....	**07 08**	.....	**07 18**	**07 33**	.....
Barking		**05 08**	**05 05**	**05 13**	**05 38**	**05 43**	**05 47**	**06 08**	**06 02**	**06 14**	**06 28**	**06 38**	**06 17**	**06 44**	**06 23**	**06 33**	**06 56**	**06 59**	**06 47**	**07 11**	**06 53**	**07 02**	**07 05**	**07 14**	**07 23**	**07 17**	**07 20**	**07 26**	**07 41**	**07 44**
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Ham		**05 13**	**05 10**	**05 18**	**05 43**	**05 48**	**05 52**	**06 13**	**06 07**	**06 19**	**06 34**	**06 43**	**06 22**	**06 49**	**06 28**	**06 38**	**07 02**	**07 05**	**06 52**	**07 17**	**06 59**	**07 08**	**07 11**	**07 20**	**07 29**	**07 23**	**07 26**	**07 32**	**07 47**	**07 50**
Limehouse		**05 18**	**05 15**	**05 23**	**05 48**	**05 53**	**05 57**	**06 18**	**06 12**	**06 24**	**06 39**	**06 48**	**06 27**	**06 55**	**06 33**	**06 43**	**07 07**	**07 10**	**06 58**	**07 22**	**07 04**	**07 13**	**07 16**	**07 25**	**07 34**	**07 28**	**07 31**	**07 37**	**07 52**	**07 55**
London Fenchurch Street	a	**05 23**	**05 20**	**05 28**	**05 53**	**05 58**	**06 02**	**06 23**	**06 17**	**06 29**	**06 44**	**06 53**	**06 32**	**07 00**	**06 38**	**06 48**	**07 14**	**07 17**	**07 05**	**07 29**	**07 11**	**07 20**	**07 23**	**07 32**	**07 41**	**07 35**	**07 38**	**07 44**	**07 59**	**08 02**

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Shoeburyness	d	**06 40**	**06 50**	.....	.....	.....	.....	.....	**07 05**	.....	.....	**07 20**	.....	.....	.....	.....	.....	.....	.....	**07 35**	.....	.....	**07 50**	.....	.....	.....	.....	.....	**08 05**	.....
Thorpe Bay		**06 43**	**06 53**	.....	.....	.....	.....	**07 01**	**07 08**	.....	**07 13**	**07 23**	.....	.....	.....	.....	.....	**07 28**	.....	**07 38**	.....	**07 43**	**07 53**	.....	.....	.....	.....	**08 02**	**08 08**	.....
Southend East		**06 46**	**06 56**	.....	.....	.....	.....	**07 03**	**07 11**	.....	**07 15**	**07 26**	.....	.....	.....	.....	.....	**07 30**	.....	**07 41**	.....	**07 45**	**07 56**	.....	.....	.....	.....	**08 05**	**08 11**	.....
Southend Central	a	**06 48**	**06 58**	.....	.....	.....	.....	**07 07**	**07 13**	.....	**07 18**	**07 28**	.....	.....	.....	.....	.....	**07 33**	.....	**07 43**	.....	**07 48**	**07 58**	.....	.....	.....	.....	**08 07**	**08 13**	.....
Southend Central	d	**06 49**	**06 59**	.....	.....	.....	**07 04**	**07 07**	**07 14**	.....	**07 18**	**07 29**	.....	.....	.....	.....	.....	**07 33**	**07 38**	**07 44**	.....	**07 48**	**07 59**	.....	.....	.....	**08 04**	**08 08**	**08 14**	.....
Westcliff		**06 51**	**07 01**	.....	.....	.....	**07 06**	**07 09**	**07 16**	.....	**07 20**	**07 31**	.....	.....	.....	.....	.....	**07 35**	**07 40**	**07 46**	.....	**07 50**	**08 01**	.....	.....	.....	**08 06**	**08 11**	**08 16**	.....
Chalkwell		**06 54**	**07 03**	.....	.....	.....	**07 09**	**07 12**	**07 18**	.....	**07 23**	**07 33**	.....	.....	.....	.....	.....	**07 38**	**07 43**	**07 48**	.....	**07 53**	**08 03**	.....	.....	.....	**08 09**	**08 13**	**08 18**	.....
Leigh-on-Sea		**06 57**	.....	**07 08**	.....	.....	**07 12**	**07 16**	.....	**07 23**	**07 27**	.....	**07 38**	.....	.....	.....	.....	**07 42**	**07 46**	.....	**07 53**	**07 57**	.....	**08 08**	.....	.....	**08 12**	**08 16**	.....	**08 23**
Benfleet		**07 02**	.....	**07 13**	.....	.....	**07 17**	**07 21**	.....	**07 28**	**07 32**	.....	**07 43**	.....	.....	.....	.....	**07 47**	**07 51**	.....	**07 58**	**08 02**	.....	**08 13**	.....	.....	**08 17**	**08 21**	.....	**08 28**
Pitsea		**07 05**	.....	.....	.....	**07 19**	**07 20**	**07 29**	.....	**07 32**	**07 35**	.....	.....	.....	.....	**07 49**	.....	**07 50**	**08 04**	.....	.....	**08 05**	.....	.....	.....	**08 19**	**08 20**	**08 29**	.....	.....
Basildon		**07 09**	.....	.....	.....	.....	**07 24**	.....	.....	**07 36**	**07 39**	.....	.....	.....	.....	.....	.....	**07 54**	.....	.....	**08 06**	**08 09**	.....	.....	.....	.....	**08 24**	.....	.....	**08 36**
Laindon		**07 13**	**07 18**	**07 22**	.....	.....	**07 28**	.....	**07 33**	.....	**07 43**	**07 48**	**07 52**	.....	.....	.....	.....	**07 58**	.....	**08 03**	.....	**08 13**	**08 18**	**08 22**	.....	.....	**08 28**	.....	**08 33**	.....
West Horndon		**07 17**	.....	.....	.....	.....	**07 32**	.....	.....	.....	**07 47**	.....	.....	.....	.....	.....	.....	**08 02**	.....	.....	.....	**08 17**	.....	.....	.....	.....	**08 32**	.....	.....	.....
Stanford-le-Hope		.....	.....	.....	.....	**07 25**	.....	**07 35**	.....	.....	.....	.....	.....	.....	.....	**07 55**	.....	.....	**08 10**	.....	.....	.....	.....	.....	.....	**08 25**	.....	**08 35**	.....	.....
East Tilbury		.....	.....	.....	.....	**07 29**	.....	**07 38**	.....	.....	.....	.....	.....	.....	.....	**07 59**	.....	.....	**08 14**	.....	.....	.....	.....	.....	.....	**08 29**	.....	**08 38**	.....	.....
Tilbury Town		.....	.....	.....	.....	**07 35**	.....	**07 44**	.....	.....	.....	.....	.....	.....	.....	**08 05**	.....	.....	**08 20**	.....	.....	.....	.....	.....	.....	**08 35**	.....	**08 44**	.....	.....
Grays		.....	.....	.....	**07 32**	**07 38**	.....	**07 48**	.....	.....	.....	.....	.....	**07 52**	**08 02**	**08 08**	**08 17**	.....	**08 23**	.....	.....	.....	.....	.....	**08 32**	**08 38**	.....	**08 48**	.....	.....
Purfleet		.....	.....	.....	.....	**07 44**	.....	.....	.....	.....	.....	.....	.....	**07 59**	.....	**08 14**	.....	.....	**08 29**	.....	.....	.....	.....	.....	.....	**08 44**	.....	.....	.....	.....
Rainham		.....	.....	.....	.....	**07 49**	.....	.....	.....	.....	.....	.....	.....	**08 04**	.....	**08 19**	.....	.....	**08 34**	.....	.....	.....	.....	.....	.....	**08 49**	.....	.....	.....	.....
Dagenham Dock		.....	.....	.....	.....	**07 53**	.....	.....	.....	.....	.....	.....	.....	**08 08**	.....	**08 23**	.....	.....	**08 38**	.....	.....	.....	.....	.....	.....	**08 53**	.....	.....	.....	.....
Chafford Hundred (Lakeside)		.....	.....	.....	**07 36**	.....	.....	**07 51**	.....	.....	.....	.....	.....	.....	**08 06**	.....	**08 21**	.....	.....	.....	.....	.....	.....	.....	**08 36**	.....	.....	**08 51**	.....	.....
Ockendon		.....	.....	.....	**07 41**	.....	.....	**07 56**	.....	.....	.....	.....	.....	.....	**08 10**	.....	**08 26**	.....	.....	.....	.....	.....	.....	.....	**08 41**	.....	.....	**08 56**	.....	.....
Upminster		**07 23**	**07 26**	.....	**07 48**	.....	**07 38**	**08 03**	**07 41**	.....	**07 53**	**07 56**	.....	.....	**08 17**	.....	**08 33**	**08 08**	.....	**08 11**	.....	**08 23**	**08 26**	.....	**08 48**	.....	**08 38**	**09 03**	**08 41**	.....
Barking		**07 32**	**07 35**	**07 38**	**07 56**	**07 59**	**07 47**	**08 11**	**07 50**	**07 53**	**08 02**	**08 05**	**08 08**	**08 14**	**08 26**	**08 29**	**08 41**	**08 17**	**08 44**	**08 20**	**08 23**	**08 32**	**08 35**	**08 38**	**08 56**	**08 59**	**08 47**	**09 11**	**08 50**	**08 53**
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Ham		**07 38**	**07 41**	**07 44**	**08 02**	**08 05**	**07 53**	**08 17**	**07 56**	**07 59**	**08 08**	**08 11**	**08 14**	**08 20**	**08 32**	**08 35**	**08 47**	**08 23**	**08 50**	**08 26**	**08 29**	**08 38**	**08 41**	**08 44**	**09 02**	**09 05**	**08 53**	**09 17**	**08 56**	**08 59**
Limehouse		**07 43**	**07 46**	**07 49**	**08 07**	**08 10**	**07 58**	**08 22**	**08 01**	**08 04**	**08 13**	**08 16**	**08 19**	**08 25**	**08 37**	**08 40**	**08 52**	**08 28**	**08 55**	**08 31**	**08 34**	**08 43**	**08 46**	**08 49**	**09 07**	**09 10**	**08 58**	**09 22**	**09 01**	**09 04**
London Fenchurch Street	a	**07 50**	**07 53**	**07 56**	**08 14**	**08 17**	**08 05**	**08 29**	**08 08**	**08 11**	**08 20**	**08 23**	**08 26**	**08 32**	**08 44**	**08 47**	**09 00**	**08 35**	**09 02**	**08 38**	**08 41**	**08 50**	**08 53**	**08 56**	**09 14**	**09 17**	**09 05**	**09 29**	**09 08**	**09 11**

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Shoeburyness	d	.....	**08 20**	.....	.....	.....	.....	.....	**08 35**	.....	.....	**08 49**	.....	.....	.....	.....	.....	**09 11**	.....	**09 26**	.....	**09 41**	.....	**09 56**	.....	**10 11**	.....	**10 26**	.....	**10 41**
Thorpe Bay		**08 13**	**08 23**	.....	.....	.....	.....	.....	**08 38**	.....	.....	**08 52**	.....	.....	.....	.....	.....	**09 15**	.....	**09 30**	.....	**09 45**	.....	**10 00**	.....	**10 15**	.....	**10 30**	.....	**10 45**
Southend East		**08 15**	**08 26**	.....	.....	.....	.....	.....	**08 41**	.....	.....	**08 55**	.....	.....	.....	.....	.....	**09 17**	.....	**09 32**	.....	**09 47**	.....	**10 02**	.....	**10 17**	.....	**10 32**	.....	**10 47**
Southend Central	a	**08 18**	**08 28**	.....	.....	.....	.....	.....	**08 43**	.....	.....	**08 57**	.....	.....	.....	.....	.....	**09 20**	.....	**09 35**	.....	**09 50**	.....	**10 05**	.....	**10 20**	.....	**10 35**	.....	**10 50**
Southend Central	d	**08 18**	**08 29**	.....	.....	.....	.....	**08 34**	**08 44**	.....	**08 50**	**08 58**	.....	.....	**09 02**	.....	**09 13**	**09 20**	.....	**09 35**	**09 43**	**09 50**	.....	**10 05**	**10 13**	**10 20**	.....	**10 35**	**10 43**	**10 50**
Westcliff		**08 20**	**08 31**	.....	.....	.....	.....	**08 36**	**08 46**	.....	**08 52**	**09 00**	.....	.....	**09 05**	.....	**09 16**	**09 22**	.....	**09 37**	**09 46**	**09 52**	.....	**10 07**	**10 16**	**10 22**	.....	**10 37**	**10 46**	**10 52**
Chalkwell		**08 23**	**08 33**	.....	.....	.....	.....	**08 39**	**08 48**	.....	**08 55**	**09 02**	.....	.....	**09 07**	.....	**09 18**	**09 25**	.....	**09 40**	**09 48**	**09 55**	.....	**10 10**	**10 18**	**10 25**	.....	**10 40**	**10 48**	**10 55**
Leigh-on-Sea		**08 27**	.....	**08 38**	.....	.....	.....	**08 42**	.....	**08 53**	**08 58**	**09 05**	.....	.....	**09 10**	.....	**09 21**	**09 27**	.....	**09 42**	**09 51**	**09 57**	.....	**10 12**	**10 21**	**10 27**	.....	**10 42**	**10 51**	**10 57**
Benfleet		**08 32**	.....	**08 43**	.....	.....	.....	**08 47**	.....	**08 58**	**09 03**	**09 10**	.....	.....	**09 15**	.....	**09 25**	**09 32**	.....	**09 47**	**09 55**	**10 02**	.....	**10 17**	**10 25**	**10 32**	.....	**10 47**	**10 55**	**11 02**
Pitsea		**08 35**	.....	.....	.....	.....	**08 49**	**08 50**	.....	.....	**09 06**	.....	.....	**09 15**	**09 19**	.....	**09 29**	.....	.....	**09 50**	**09 59**	.....	.....	**10 20**	**10 29**	.....	.....	**10 50**	**10 59**	.....
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Laindon		**08 43**	**08 48**	**08 52**	.....	.....	.....	**08 58**	**09 03**	.....	**09 14**	**09 20**	.....	.....	**09 26**	.....	.....	**09 40**	.....	**09 57**	.....	**10 10**	.....	**10 27**	.....	**10 40**	.....	**10 57**	.....	**11 10**
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Stanford-le-Hope		.....	.....	.....	.....	.....	**08 55**	.....	.....	.....	.....	.....	.....	**09 21**	.....	.....	**09 35**	.....	.....	.....	**10 05**	.....	.....	.....	**10 35**	.....	.....	.....	**11 05**	.....
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Tilbury Town		.....	.....	.....	.....	.....	**09 05**	.....	.....	.....	.....	.....	.....	**09 30**	.....	.....	**09 44**	.....	.....	.....	**10 14**	.....	.....	.....	**10 44**	.....	.....	.....	**11 14**	.....
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Dagenham Dock		.....	.....	.....	**09 08**	.....	**09 23**	.....	.....	.....	.....	.....	.....	**09 48**	.....	**09 55**	.....	.....	**10 24**	.....	.....	.....	**10 54**	.....	.....	.....	**11 24**	.....	.....	.....
Chafford Hundred (Lakeside)		.....	.....	.....	.....	**09 06**	.....	.....	.....	.....	.....	.....	**09 20**	.....	.....	.....	**09 52**	.....	.....	.....	**10 21**	.....	.....	.....	**10 51**	.....	.....	.....	**11 21**	.....
Ockendon		.....	.....	.....	.....	**09 11**	.....	.....	.....	.....	.....	.....	**09 24**	.....	.....	.....	**09 56**	.....	.....	.....	**10 25**	.....	.....	.....	**10 55**	.....	.....	.....	**11 25**	.....
Upminster		**08 53**	**08 56**	.....	.....	**09 18**	.....	**09 08**	**09 11**	.....	**09 24**	**09 28**	**09 31**	.....	**09 36**	.....	**10 03**	**09 49**	.....	**10 06**	**10 31**	**10 18**	.....	**10 36**	**11 01**	**10 48**	.....	**11 06**	**11 31**	**11 18**
Barking		**09 02**	**09 05**	**09 08**	**09 14**	**09 26**	**09 29**	**09 17**	**09 20**	**09 23**	**09 32**	**09 37**	**09 40**	**09 54**	**09 45**	**10 01**	**10 11**	**09 57**	**10 30**	**10 14**	**10 39**	**10 26**	**11 00**	**10 44**	**11 09**	**10 56**	**11 30**	**11 14**	**11 39**	**11 26**
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Ham		**09 08**	**09 11**	**09 14**	**09 20**	**09 32**	**09 35**	**09 23**	**09 26**	**09 29**	**09 38**	**09 43**	**09 46**	**09 59**	**09 50**	**10 06**	**10 16**	**10 02**	**10 35**	**10 19**	**10 44**	**10 31**	**11 05**	**10 49**	**11 14**	**11 01**	**11 35**	**11 19**	**11 44**	**11 31**
Limehouse		**09 13**	**09 16**	**09 19**	**09 25**	**09 37**	**09 40**	**09 28**	**09 31**	**09 34**	**09 43**	**09 48**	**09 51**	**10 05**	**09 56**	**10 11**	**10 21**	**10 07**	**10 40**	**10 24**	**10 49**	**10 36**	**11 10**	**10 54**	**11 19**	**11 06**	**11 40**	**11 24**	**11 49**	**11 36**
London Fenchurch Street	a	**09 20**	**09 23**	**09 26**	**09 32**	**09 44**	**09 47**	**09 35**	**09 38**	**09 41**	**09 50**	**09 55**	**09 58**	**10 10**	**10 01**	**10 16**	**10 26**	**10 13**	**10 45**	**10 29**	**10 54**	**10 41**	**11 15**	**10 59**	**11 24**	**11 11**	**11 45**	**11 29**	**11 54**	**11 41**

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Shoeburyness	d	.....	**10 56**	.....	**11 11**	.....	**11 26**	.....	**11 41**	.....	**11 56**	.....	**12 11**	.....	**12 26**	.....	**12 41**	.....	**12 56**	.....	**13 11**	.....	**13 26**	.....	**13 41**	.....	**13 56**	.....	**14 11**	.....
Thorpe Bay		.....	**11 00**	.....	**11 15**	.....	**11 30**	.....	**11 45**	.....	**12 00**	.....	**12 15**	.....	**12 30**	.....	**12 45**	.....	**13 00**	.....	**13 15**	.....	**13 30**	.....	**13 45**	.....	**14 00**	.....	**14 15**	.....
Southend East		.....	**11 02**	.....	**11 17**	.....	**11 32**	.....	**11 47**	.....	**12 02**	.....	**12 17**	.....	**12 32**	.....	**12 47**	.....	**13 02**	.....	**13 17**	.....	**13 32**	.....	**13 47**	.....	**14 02**	.....	**14 17**	.....
Southend Central	a	.....	**11 05**	.....	**11 20**	.....	**11 35**	.....	**11 50**	.....	**12 05**	.....	**12 20**	.....	**12 35**	.....	**12 50**	.....	**13 05**	.....	**13 20**	.....	**13 35**	.....	**13 50**	.....	**14 05**	.....	**14 20**	.....
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Westcliff		.....	**11 07**	**11 16**	**11 22**	.....	**11 37**	**11 46**	**11 52**	.....	**12 07**	**12 16**	**12 22**	.....	**12 37**	**12 46**	**12 52**	.....	**13 07**	**13 16**	**13 22**	.....	**13 37**	**13 46**	**13 52**	.....	**14 07**	**14 16**	**14 22**	.....
Chalkwell		.....	**11 10**	**11 18**	**11 25**	.....	**11 40**	**11 48**	**11 55**	.....	**12 10**	**12 18**	**12 25**	.....	**12 40**	**12 48**	**12 55**	.....	**13 10**	**13 18**	**13 25**	.....	**13 40**	**13 48**	**13 55**	.....	**14 10**	**14 18**	**14 25**	.....
Leigh-on-Sea		.....	**11 12**	**11 21**	**11 27**	.....	**11 42**	**11 51**	**11 57**	.....	**12 12**	**12 21**	**12 27**	.....	**12 42**	**12 51**	**12 57**	.....	**13 12**	**13 21**	**13 27**	.....	**13 42**	**13 51**	**13 57**	.....	**14 12**	**14 21**	**14 27**	.....
Benfleet		.....	**11 17**	**11 25**	**11 32**	.....	**11 47**	**11 55**	**12 02**	.....	**12 17**	**12 25**	**12 32**	.....	**12 47**	**12 55**	**13 02**	.....	**13 17**	**13 25**	**13 32**	.....	**13 47**	**13 55**	**14 02**	.....	**14 17**	**14 25**	**14 32**	.....
Pitsea		.....	**11 20**	**11 29**	.....	.....	**11 50**	**11 59**	.....	.....	**12 20**	**12 29**	.....	.....	**12 50**	**12 59**	.....	.....	**13 20**	**13 29**	.....	.....	**13 50**	**13 59**	.....	.....	**14 20**	**14 29**	.....	.....
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Laindon		.....	**11 27**	.....	**11 40**	.....	**11 57**	.....	**12 10**	.....	**12 27**	.....	**12 40**	.....	**12 57**	.....	**13 10**	.....	**13 27**	.....	**13 40**	.....	**13 57**	.....	**14 10**	.....	**14 27**	.....	**14 40**	.....
West Horndon		.....	**11 31**	.....	.....	.....	**12 01**	.....	.....	.....	**12 31**	.....	.....	.....	**13 01**	.....	.....	.....	**13 31**	.....	.....	.....	**14 01**	.....	.....	.....	**14 31**	.....	.....	.....
Stanford-le-Hope		.....	.....	**11 35**	.....	.....	.....	**12 05**	.....	.....	.....	**12 35**	.....	.....	.....	**13 05**	.....	.....	.....	**13 35**	.....	.....	.....	**14 05**	.....	.....	.....	**14 35**	.....	.....
East Tilbury		.....	.....	**11 38**	.....	.....	.....	**12 08**	.....	.....	.....	**12 38**	.....	.....	.....	**13 08**	.....	.....	.....	**13 38**	.....	.....	.....	**14 08**	.....	.....	.....	**14 38**	.....	.....
Tilbury Town		.....	.....	**11 44**	.....	.....	.....	**12 14**	.....	.....	.....	**12 44**	.....	.....	.....	**13 14**	.....	.....	.....	**13 44**	.....	.....	.....	**14 14**	.....	.....	.....	**14 44**	.....	.....
Grays		**11 40**	.....	**11 47**	.....	**12 10**	.....	**12 17**	.....	**12 40**	.....	**12 47**	.....	**13 10**	.....	**13 17**	.....	**13 40**	.....	**13 47**	.....	**14 10**	.....	**14 17**	.....	**14 40**	.....	**14 47**	.....	**15 10**
Purfleet		**11 46**	.....	.....	.....	**12 16**	.....	.....	.....	**12 46**	.....	.....	.....	**13 16**	.....	.....	.....	**13 46**	.....	.....	.....	**14 16**	.....	.....	.....	**14 46**	.....	.....	.....	**15 16**
Rainham		**11 51**	.....	.....	.....	**12 21**	.....	.....	.....	**12 51**	.....	.....	.....	**13 21**	.....	.....	.....	**13 51**	.....	.....	.....	**14 21**	.....	.....	.....	**14 51**	.....	.....	.....	**15 21**
Dagenham Dock		**11 54**	.....	.....	.....	**12 24**	.....	.....	.....	**12 54**	.....	.....	.....	**13 24**	.....	.....	.....	**13 54**	.....	.....	.....	**14 24**	.....	.....	.....	**14 54**	.....	.....	.....	**15 24**
Chafford Hundred (Lakeside)		.....	.....	**11 51**	.....	.....	.....	**12 21**	.....	.....	.....	**12 51**	.....	.....	.....	**13 21**	.....	.....	.....	**13 51**	.....	.....	.....	**14 21**	.....	.....	.....	**14 51**	.....	.....
Ockendon		.....	.....	**11 55**	.....	.....	.....	**12 25**	.....	.....	.....	**12 55**	.....	.....	.....	**13 25**	.....	.....	.....	**13 55**	.....	.....	.....	**14 25**	.....	.....	.....	**14 55**	.....	.....
Upminster		.....	**11 36**	**12 01**	**11 48**	.....	**12 06**	**12 31**	**12 18**	.....	**12 36**	**13 01**	**12 48**	.....	**13 06**	**13 31**	**13 18**	.....	**13 36**	**14 01**	**13 48**	.....	**14 06**	**14 31**	**14 18**	.....	**14 36**	**15 01**	**14 48**	.....
Barking		**12 00**	**11 44**	**12 09**	**11 56**	**12 30**	**12 14**	**12 39**	**12 26**	**13 00**	**12 44**	**13 09**	**12 56**	**13 30**	**13 14**	**13 39**	**13 26**	**14 00**	**13 44**	**14 09**	**13 56**	**14 30**	**14 14**	**14 39**	**14 26**	**15 00**	**14 44**	**15 09**	**14 56**	**15 30**
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Ham		**12 05**	**11 49**	**12 14**	**12 01**	**12 35**	**12 19**	**12 44**	**12 31**	**13 05**	**12 49**	**13 14**	**13 01**	**13 35**	**13 19**	**13 44**	**13 31**	**14 05**	**13 49**	**14 14**	**14 01**	**14 35**	**14 19**	**14 44**	**14 31**	**15 05**	**14 49**	**15 14**	**15 01**	**15 35**
Limehouse		**12 10**	**11 54**	**12 19**	**12 06**	**12 40**	**12 24**	**12 49**	**12 36**	**13 10**	**12 54**	**13 19**	**13 06**	**13 40**	**13 24**	**13 49**	**13 36**	**14 10**	**13 54**	**14 19**	**14 06**	**14 40**	**14 24**	**14 49**	**14 36**	**15 10**	**14 54**	**15 19**	**15 06**	**15 40**
London Fenchurch Street	a	**12 15**	**11 59**	**12 24**	**12 11**	**12 45**	**12 29**	**12 54**	**12 41**	**13 15**	**12 59**	**13 24**	**13 11**	**13 45**	**13 29**	**13 54**	**13 41**	**14 15**	**13 59**	**14 24**	**14 11**	**14 45**	**14 29**	**14 54**	**14 41**	**15 15**	**14 59**	**15 24**	**15 11**	**15 45**

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Shoeburyness	d	**14 26**	.....	**14 41**	.....	**14 56**	.....	**15 12**	.....	**15 29**	.....	**15 44**	**16 00**	.....	.....	.....	**16 11**	.....	.....	.....	**16 29**	.....	**16 44**	.....	.....	**16 59**	.....	.....	**17 06**	.....
Thorpe Bay		**14 30**	.....	**14 45**	.....	**15 00**	.....	**15 16**	.....	**15 33**	.....	**15 47**	**16 04**	.....	.....	.....	**16 14**	.....	.....	.....	**16 33**	.....	**16 48**	.....	.....	**17 03**	.....	.....	**17 09**	.....
Southend East		**14 32**	.....	**14 47**	.....	**15 02**	.....	**15 18**	.....	**15 35**	.....	**15 50**	**16 06**	.....	.....	.....	**16 17**	.....	.....	.....	**16 35**	.....	**16 50**	.....	.....	**17 05**	.....	.....	**17 12**	.....
Southend Central	a	**14 35**	.....	**14 50**	.....	**15 05**	.....	**15 21**	.....	**15 38**	.....	**15 52**	**16 09**	.....	.....	.....	**16 19**	.....	.....	.....	**16 38**	.....	**16 53**	.....	.....	**17 08**	.....	.....	**17 14**	.....
Southend Central	d	**14 35**	**14 43**	**14 50**	.....	**15 05**	**15 13**	**15 21**	.....	**15 38**	**15 43**	**15 53**	**16 09**	.....	.....	**16 14**	**16 20**	.....	**16 29**	**16 32**	**16 38**	**16 45**	**16 53**	**16 58**	.....	**17 08**	.....	.....	**17 15**	.....
Westcliff		**14 37**	**14 46**	**14 52**	.....	**15 07**	**15 16**	**15 23**	.....	**15 40**	**15 45**	**15 55**	**16 11**	.....	.....	**16 17**	**16 22**	.....	**16 31**	**16 35**	**16 40**	**16 47**	**16 55**	**17 00**	.....	**17 10**	.....	.....	**17 17**	.....
Chalkwell		**14 40**	**14 48**	**14 55**	.....	**15 10**	**15 18**	**15 26**	.....	**15 43**	**15 48**	**15 57**	**16 14**	.....	.....	**16 19**	**16 24**	.....	**16 34**	**16 37**	**16 43**	**16 50**	**16 58**	**17 03**	.....	**17 13**	.....	.....	**17 19**	.....
Leigh-on-Sea		**14 42**	**14 51**	**14 57**	.....	**15 12**	**15 21**	**15 28**	.....	**15 45**	**15 50**	**16 00**	**16 16**	.....	.....	**16 22**	**16 27**	**16 31**	**16 36**	**16 40**	**16 45**	**16 53**	**17 00**	**17 05**	.....	**17 15**	.....	.....	**17 22**	**17 25**
Benfleet		**14 47**	**14 55**	**15 02**	.....	**15 17**	**15 25**	**15 33**	.....	**15 50**	**15 55**	**16 04**	**16 21**	.....	.....	**16 26**	**16 31**	**16 36**	**16 41**	**16 44**	**16 50**	**16 57**	**17 05**	**17 10**	.....	**17 20**	.....	.....	**17 26**	**17 31**
Pitsea		**14 50**	**14 59**	.....	.....	**15 20**	**15 29**	.....	.....	**15 53**	**15 58**	.....	**16 24**	.....	.....	**16 31**	**16 35**	.....	**16 45**	**16 49**	**16 53**	**17 01**	**17 08**	**17 14**	.....	**17 23**	.....	**17 24**	**17 30**	.....
Basildon		**14 54**	.....	**15 07**	.....	**15 24**	.....	**15 38**	.....	**15 57**	.....	**16 10**	**16 28**	.....	.....	.....	**16 39**	**16 43**	**16 49**	.....	**16 57**	**17 04**	**17 12**	**17 18**	.....	**17 27**	.....	.....	**17 34**	**17 37**
Laindon		**14 57**	.....	**15 10**	.....	**15 27**	.....	**15 41**	.....	**16 00**	.....	**16 13**	**16 31**	.....	.....	.....	**16 42**	**16 46**	**16 52**	.....	**17 00**	**17 07**	**17 15**	**17 21**	.....	**17 30**	.....	.....	**17 37**	**17 40**
West Horndon		**15 01**	.....	.....	.....	**15 31**	.....	.....	.....	**16 04**	.....	.....	**16 35**	.....	.....	.....	**16 47**	.....	.....	.....	**17 04**	.....	**17 19**	.....	.....	**17 34**	.....	.....	.....	.....
Stanford-le-Hope		.....	**15 05**	.....	.....	.....	**15 35**	.....	.....	.....	**16 04**	.....	.....	.....	.....	**16 37**	.....	.....	.....	**16 55**	.....	.....	.....	.....	.....	.....	.....	**17 30**	.....	.....
East Tilbury		.....	**15 08**	.....	.....	.....	**15 38**	.....	.....	.....	**16 08**	.....	.....	.....	.....	**16 40**	.....	.....	.....	**16 59**	.....	.....	.....	.....	.....	.....	.....	**17 34**	.....	.....
Tilbury Town		.....	**15 14**	.....	.....	.....	**15 44**	.....	.....	.....	**16 14**	.....	.....	.....	.....	**16 46**	.....	.....	.....	**17 05**	.....	.....	.....	.....	.....	.....	.....	**17 40**	.....	.....
Grays		.....	**15 17**	.....	**15 40**	.....	**15 47**	.....	**16 09**	.....	**16 17**	.....	.....	**16 38**	**16 48**	**16 50**	.....	.....	.....	**17 08**	.....	.....	.....	.....	**17 17**	.....	**17 29**	**17 43**	.....	.....
Purfleet		.....	.....	.....	**15 46**	.....	.....	.....	**16 15**	.....	.....	.....	.....	**16 44**	.....	**16 56**	.....	.....	.....	**17 13**	.....	.....	.....	.....	.....	.....	**17 35**	**17 49**	.....	.....
Rainham		.....	.....	.....	**15 51**	.....	.....	.....	**16 20**	.....	.....	.....	.....	**16 49**	.....	**17 01**	.....	.....	.....	**17 18**	.....	.....	.....	.....	.....	.....	**17 40**	**17 54**	.....	.....
Dagenham Dock		.....	.....	.....	**15 54**	.....	.....	.....	**16 24**	.....	.....	.....	.....	**16 52**	.....	**17 04**	.....	.....	.....	**17 22**	.....	.....	.....	.....	.....	.....	**17 43**	**17 58**	.....	.....
Chafford Hundred (Lakeside)		.....	**15 21**	.....	.....	.....	**15 51**	.....	.....	.....	**16 21**	.....	.....	.....	**16 52**	.....	.....	.....	.....	.....	.....	.....	.....	.....	**17 21**	.....	.....	.....	.....	.....
Ockendon		.....	**15 25**	.....	.....	.....	**15 55**	.....	.....	.....	**16 25**	.....	.....	.....	**16 57**	.....	.....	.....	.....	.....	.....	.....	.....	.....	**17 27**	.....	.....	.....	.....	.....
Upminster		**15 06**	**15 31**	**15 18**	.....	**15 36**	**16 02**	**15 49**	.....	**16 09**	**16 32**	**16 21**	**16 40**	.....	**17 04**	.....	**16 53**	**16 56**	**17 00**	.....	**17 09**	**17 15**	**17 24**	**17 29**	**17 34**	**17 39**	.....	.....	**17 45**	**17 48**
Barking		**15 14**	**15 39**	**15 26**	**16 01**	**15 44**	**16 11**	**15 57**	**16 31**	**16 17**	**16 41**	**16 29**	**16 48**	**16 58**	**17 13**	**17 10**	**17 01**	**17 04**	**17 08**	**17 28**	**17 17**	**17 23**	**17 32**	**17 38**	**17 43**	**17 47**	**17 50**	**18 05**	**17 53**	**17 56**
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Ham		**15 20**	**15 44**	**15 31**	**16 06**	**15 49**	**16 16**	**16 02**	**16 36**	**16 22**	**16 47**	**16 34**	**16 53**	**17 04**	**17 19**	**17 16**	**17 07**	**17 10**	**17 13**	**17 34**	**17 22**	**17 28**	**17 37**	**17 43**	**17 49**	**17 52**	**17 55**	**18 10**	**17 58**	**18 01**
Limehouse		**15 25**	**15 49**	**15 36**	**16 12**	**15 54**	**16 21**	**16 07**	**16 41**	**16 27**	**16 52**	**16 39**	**16 58**	**17 09**	**17 24**	**17 21**	**17 12**	**17 15**	**17 18**	**17 39**	**17 27**	**17 33**	**17 42**	**17 48**	**17 54**	**17 57**	**18 00**	**18 15**	**18 03**	**18 06**
London Fenchurch Street	a	**15 30**	**15 54**	**15 41**	**16 17**	**15 59**	**16 26**	**16 12**	**16 46**	**16 32**	**16 57**	**16 44**	**17 03**	**17 14**	**17 29**	**17 26**	**17 17**	**17 20**	**17 23**	**17 44**	**17 32**	**17 38**	**17 47**	**17 53**	**17 59**	**18 02**	**18 05**	**18 20**	**18 08**	**18 11**

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Shoeburyness	d	**17 14**	.....	.....	.....	**17 29**	.....	.....	.....	.....	**17 44**	.....	.....	**17 59**	.....	.....	.....	.....	**18 15**	.....	**18 30**	.....	**18 45**	.....	.....	**18 58**	.....	**19 11**	.....	**19 26**
Thorpe Bay		**17 18**	.....	.....	.....	**17 33**	.....	.....	.....	.....	**17 48**	.....	.....	**18 02**	.....	.....	.....	.....	**18 19**	.....	**18 34**	.....	**18 49**	.....	.....	**19 02**	.....	**19 15**	.....	**19 30**
Southend East		**17 20**	.....	.....	.....	**17 35**	.....	.....	.....	.....	**17 50**	.....	.....	**18 05**	.....	.....	.....	.....	**18 21**	.....	**18 36**	.....	**18 51**	.....	.....	**19 04**	.....	**19 17**	.....	**19 32**
Southend Central	a	**17 23**	.....	.....	.....	**17 38**	.....	.....	.....	.....	**17 53**	.....	.....	**18 07**	.....	.....	.....	.....	**18 24**	.....	**18 39**	.....	**18 54**	.....	.....	**19 07**	.....	**19 20**	.....	**19 35**
Southend Central	d	**17 23**	**17 26**	.....	.....	**17 38**	.....	.....	**17 41**	.....	**17 53**	.....	.....	**18 08**	.....	.....	**18 11**	.....	**18 24**	**18 29**	**18 39**	**18 43**	**18 54**	.....	.....	**19 07**	**19 13**	**19 20**	.....	**19 35**
Westcliff		**17 25**	**17 29**	.....	.....	**17 40**	.....	.....	**17 43**	.....	**17 55**	.....	.....	**18 10**	.....	.....	**18 13**	.....	**18 26**	**18 31**	**18 41**	**18 46**	**18 56**	.....	.....	**19 09**	**19 16**	**19 22**	.....	**19 37**
Chalkwell		**17 28**	**17 31**	.....	.....	**17 43**	.....	.....	**17 46**	.....	**17 58**	.....	.....	**18 12**	.....	.....	**18 16**	.....	**18 29**	**18 34**	**18 44**	**18 48**	**18 59**	.....	.....	**19 12**	**19 18**	**19 25**	.....	**19 40**
Leigh-on-Sea		**17 30**	**17 34**	**17 37**	.....	**17 45**	.....	.....	**17 49**	**17 52**	**18 00**	**18 07**	.....	**18 15**	.....	.....	**18 18**	**18 22**	**18 31**	**18 36**	**18 46**	**18 51**	**19 01**	.....	.....	**19 14**	**19 21**	**19 27**	.....	**19 42**
Benfleet		**17 35**	**17 39**	**17 43**	.....	**17 50**	.....	.....	**17 53**	**17 58**	**18 05**	**18 13**	.....	**18 20**	.....	.....	**18 23**	**18 28**	**18 36**	**18 41**	**18 51**	**18 55**	**19 06**	.....	.....	**19 19**	**19 25**	**19 32**	.....	**19 47**
Pitsea		**17 38**	**17 44**	.....	.....	**17 53**	.....	**17 54**	**17 57**	.....	**18 08**	.....	.....	**18 23**	.....	.....	**18 26**	.....	**18 39**	**18 44**	**18 54**	**18 59**	**19 09**	.....	.....	**19 22**	**19 29**	.....	.....	**19 50**
Basildon		**17 42**	**17 47**	**17 50**	.....	**17 57**	.....	.....	**18 01**	**18 05**	**18 12**	**18 20**	.....	**18 27**	.....	.....	.....	**18 35**	**18 43**	.....	**18 58**	.....	**19 13**	.....	.....	**19 26**	.....	**19 37**	.....	**19 54**
Laindon		**17 45**	**17 51**	**17 53**	.....	**18 00**	.....	.....	**18 04**	**18 09**	**18 15**	**18 23**	.....	**18 30**	.....	.....	.....	**18 39**	**18 46**	.....	**19 01**	.....	**19 16**	.....	.....	**19 29**	.....	**19 40**	.....	**19 57**
West Horndon		**17 49**	.....	.....	.....	**18 04**	.....	.....	.....	.....	**18 19**	.....	.....	**18 35**	.....	.....	.....	.....	**18 50**	.....	**19 05**	.....	**19 20**	.....	.....	**19 33**	.....	.....	.....	**20 01**
Stanford-le-Hope		.....	.....	.....	.....	.....	.....	**18 00**	.....	.....	.....	.....	.....	.....	.....	.....	**18 32**	.....	.....	**18 50**	.....	**19 05**	.....	.....	.....	.....	**19 35**	.....	.....	.....
East Tilbury		.....	.....	.....	.....	.....	.....	**18 04**	.....	.....	.....	.....	.....	.....	.....	.....	**18 36**	.....	.....	**18 54**	.....	**19 08**	.....	.....	.....	.....	**19 38**	.....	.....	.....
Tilbury Town		.....	.....	.....	.....	.....	.....	**18 10**	.....	.....	.....	.....	.....	.....	.....	.....	**18 42**	.....	.....	**19 00**	.....	**19 14**	.....	.....	.....	.....	**19 44**	.....	.....	.....
Grays		.....	.....	.....	**17 49**	.....	**17 58**	**18 13**	.....	.....	.....	.....	**18 17**	.....	**18 29**	**18 42**	**18 46**	.....	.....	**19 03**	.....	**19 17**	.....	**19 23**	**19 40**	.....	**19 47**	.....	**20 10**	.....
Purfleet		.....	.....	.....	.....	.....	**18 04**	**18 19**	.....	.....	.....	.....	.....	.....	**18 35**	**18 48**	.....	.....	.....	**19 09**	.....	.....	.....	**19 29**	**19 46**	.....	.....	.....	**20 16**	.....
Rainham		.....	.....	.....	.....	.....	**18 09**	**18 24**	.....	.....	.....	.....	.....	.....	**18 41**	**18 54**	.....	.....	.....	**19 14**	.....	.....	.....	**19 34**	**19 51**	.....	.....	.....	**20 21**	.....
Dagenham Dock		.....	.....	.....	.....	.....	**18 13**	**18 28**	.....	.....	.....	.....	.....	.....	**18 44**	**18 58**	.....	.....	.....	**19 18**	.....	.....	.....	**19 37**	**19 54**	.....	.....	.....	**20 24**	.....
Chafford Hundred (Lakeside)		.....	.....	.....	**17 53**	.....	.....	.....	.....	.....	.....	.....	**18 21**	.....	.....	.....	**18 51**	.....	.....	.....	.....	**19 21**	.....	.....	.....	.....	**19 51**	.....	.....	.....
Ockendon		.....	.....	.....	**17 57**	.....	.....	.....	.....	.....	.....	.....	**18 27**	.....	.....	.....	**18 57**	.....	.....	.....	.....	**19 25**	.....	.....	.....	.....	**19 55**	.....	.....	.....
Upminster		**17 54**	**17 59**	**18 01**	**18 04**	**18 09**	.....	.....	**18 13**	**18 17**	**18 24**	**18 32**	**18 35**	**18 40**	.....	.....	**19 03**	**18 47**	**18 55**	.....	**19 10**	**19 31**	**19 25**	.....	.....	**19 38**	**20 01**	**19 48**	.....	**20 06**
Barking		**18 02**	**18 07**	**18 10**	**18 13**	**18 17**	**18 20**	**18 35**	**18 22**	**18 25**	**18 32**	**18 40**	**18 43**	**18 48**	**18 50**	**19 05**	**19 11**	**18 58**	**19 03**	**19 24**	**19 18**	**19 39**	**19 33**	**19 43**	**20 00**	**19 46**	**20 09**	**19 56**	**20 30**	**20 14**
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Ham		**18 07**	**18 13**	**18 16**	**18 19**	**18 22**	**18 25**	**18 40**	**18 28**	**18 31**	**18 37**	**18 46**	**18 49**	**18 53**	**18 56**	**19 11**	**19 16**	**19 04**	**19 08**	**19 30**	**19 23**	**19 44**	**19 38**	**19 48**	**20 05**	**19 51**	**20 14**	**20 01**	**20 35**	**20 19**
Limehouse		**18 12**	**18 18**	**18 21**	**18 24**	**18 27**	**18 30**	**18 45**	**18 33**	**18 36**	**18 42**	**18 51**	**18 54**	**18 58**	**19 01**	**19 17**	**19 21**	**19 09**	**19 13**	**19 35**	**19 28**	**19 49**	**19 43**	**19 53**	**20 10**	**19 56**	**20 19**	**20 06**	**20 40**	**20 24**
London Fenchurch Street	a	**18 17**	**18 23**	**18 26**	**18 29**	**18 32**	**18 35**	**18 50**	**18 38**	**18 41**	**18 47**	**18 56**	**18 59**	**19 03**	**19 06**	**19 22**	**19 26**	**19 14**	**19 18**	**19 40**	**19 33**	**19 54**	**19 48**	**19 58**	**20 15**	**20 01**	**20 24**	**20 11**	**20 45**	**20 29**

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Shoeburyness	d	.....	**19 41**	.....	**19 56**	.....	**20 11**	.....	**20 26**	.....	**20 41**	**20 56**	.....	.....	.....	**21 26**	.....	**21 41**	**21 56**	.....	.....	**22 26**	.....	.....	**22 56**	.....	.....	**23 26**	
Thorpe Bay		.....	**19 45**	.....	**20 00**	.....	**20 15**	.....	**20 30**	.....	**20 45**	**21 00**	.....	.....	.....	**21 30**	.....	**21 45**	**22 00**	.....	.....	**22 30**	.....	.....	**23 00**	.....	.....	**23 30**	
Southend East		.....	**19 47**	.....	**20 02**	.....	**20 17**	.....	**20 32**	.....	**20 47**	**21 02**	.....	.....	.....	**21 32**	.....	**21 47**	**22 02**	.....	.....	**22 32**	.....	.....	**23 02**	.....	.....	**23 32**	
Southend Central	a	.....	**19 50**	.....	**20 05**	.....	**20 20**	.....	**20 35**	.....	**20 50**	**21 05**	.....	.....	.....	**21 35**	.....	**21 50**	**22 05**	.....	.....	**22 35**	.....	.....	**23 05**	.....	.....	**23 35**	
Southend Central	d	**19 43**	**19 50**	.....	**20 05**	**20 13**	**20 20**	.....	**20 35**	**20 43**	**20 50**	**21 05**	.....	**21 13**	.....	**21 35**	**21 43**	**21 50**	**22 05**	.....	**22 13**	**22 35**	.....	**22 43**	**23 05**	.....	**23 13**	**23 35**	
Westcliff		**19 46**	**19 52**	.....	**20 07**	**20 16**	**20 22**	.....	**20 37**	**20 46**	**20 52**	**21 07**	.....	**21 16**	.....	**21 37**	**21 46**	**21 52**	**22 07**	.....	**22 16**	**22 37**	.....	**22 46**	**23 07**	.....	**23 16**	**23 37**	
Chalkwell		**19 48**	**19 55**	.....	**20 10**	**20 18**	**20 25**	.....	**20 40**	**20 48**	**20 55**	**21 10**	.....	**21 18**	.....	**21 40**	**21 48**	**21 55**	**22 10**	.....	**22 18**	**22 40**	.....	**22 48**	**23 10**	.....	**23 18**	**23 40**	
Leigh-on-Sea		**19 51**	**19 57**	.....	**20 12**	**20 21**	**20 27**	.....	**20 42**	**20 51**	**20 57**	**21 12**	.....	**21 21**	.....	**21 42**	**21 51**	**21 57**	**22 12**	.....	**22 21**	**22 42**	.....	**22 51**	**23 12**	.....	**23 21**	**23 42**	
Benfleet		**19 55**	**20 02**	.....	**20 17**	**20 25**	**20 32**	.....	**20 47**	**20 55**	**21 02**	**21 17**	.....	**21 25**	.....	**21 47**	**21 55**	**22 02**	**22 17**	.....	**22 25**	**22 47**	.....	**22 55**	**23 17**	.....	**23 25**	**23 47**	
Pitsea		**19 59**	.....	.....	**20 20**	**20 29**	.....	.....	**20 50**	**20 59**	.....	**21 20**	.....	**21 29**	.....	**21 50**	**21 59**	.....	**22 20**	.....	**22 29**	**22 50**	.....	**22 59**	**23 20**	.....	**23 29**	**23 50**	
Basildon		.....	**20 07**	.....	**20 24**	.....	**20 37**	.....	**20 54**	.....	**21 07**	**21 24**	.....	.....	.....	**21 54**	.....	**22 07**	**22 24**	.....	.....	**22 54**	.....	.....	**23 24**	.....	.....	**23 54**	
Laindon		.....	**20 10**	.....	**20 27**	.....	**20 40**	.....	**20 57**	.....	**21 10**	**21 27**	.....	.....	.....	**21 57**	.....	**22 10**	**22 27**	.....	.....	**22 57**	.....	.....	**23 27**	.....	.....	**23 57**	
West Horndon		.....	.....	.....	**20 31**	.....	.....	.....	**21 01**	.....	.....	**21 31**	.....	.....	.....	**22 01**	.....	.....	**22 31**	.....	.....	**23 01**	.....	.....	**23 31**	.....	.....	**00 01**	
Stanford-le-Hope		**20 05**	.....	.....	.....	**20 35**	.....	.....	.....	**21 05**	.....	.....	.....	**21 35**	.....	.....	**22 05**	.....	.....	.....	**22 35**	.....	.....	**23 05**	.....	.....	**23 35**	.....	
East Tilbury		**20 08**	.....	.....	.....	**20 38**	.....	.....	.....	**21 08**	.....	.....	.....	**21 38**	.....	.....	**22 08**	.....	.....	.....	**22 38**	.....	.....	**23 08**	.....	.....	**23 38**	.....	
Tilbury Town		**20 14**	.....	.....	.....	**20 44**	.....	.....	.....	**21 14**	.....	.....	.....	**21 44**	.....	.....	**22 14**	.....	.....	.....	**22 44**	.....	.....	**23 14**	.....	.....	**23 44**	.....	
Grays		**20 17**	.....	**20 40**	.....	**20 47**	.....	**21 10**	.....	**21 17**	.....	.....	**21 40**	**21 47**	**22 10**	.....	**22 17**	.....	.....	**22 40**	**22 47**	.....	**23 10**	**23 17**	.....	**23 39**	**23 47**	.....	
Purfleet		.....	.....	**20 46**	.....	.....	.....	**21 16**	.....	.....	.....	.....	**21 46**	.....	**22 16**	.....	.....	.....	.....	**22 46**	.....	.....	**23 16**	.....	.....	**23 45**	.....	.....	.....	
Rainham		.....	.....	**20 51**	.....	.....	.....	**21 21**	.....	.....	.....	.....	**21 51**	.....	**22 21**	.....	.....	.....	.....	**22 51**	.....	.....	**23 21**	.....	.....	**23 50**	.....	.....	.....	
Dagenham Dock		.....	.....	**20 54**	.....	.....	.....	**21 24**	.....	.....	.....	.....	**21 54**	.....	**22 24**	.....	.....	.....	.....	**22 54**	.....	.....	**23 24**	.....	.....	**23 54**	.....	.....	.....	
Chafford Hundred (Lakeside)		**20 21**	.....	.....	.....	**20 51**	.....	.....	.....	**21 21**	.....	.....	.....	**21 51**	.....	.....	**22 21**	.....	.....	.....	**22 51**	.....	.....	**23 21**	.....	.....	**23 51**	.....	
Ockendon		**20 25**	.....	.....	.....	**20 55**	.....	.....	.....	**21 25**	.....	.....	.....	**21 55**	.....	.....	**22 25**	.....	.....	.....	**22 55**	.....	.....	**23 25**	.....	.....	**23 55**	.....	
Upminster		**20 31**	**20 18**	.....	**20 36**	**21 01**	**20 48**	.....	**21 06**	**21 31**	**21 18**	**21 36**	.....	**22 01**	.....	**22 06**	**22 31**	**22 18**	**22 36**	.....	**23 01**	**23 06**	.....	**23 31**	**23 36**	.....	**00 01**	**00 06**	
Barking		**20 39**	**20 26**	**21 00**	**20 44**	**21 09**	**20 56**	**21 30**	**21 14**	**21 39**	**21 26**	**21 44**	**22 00**	**22 09**	**22 30**	**22 14**	**22 39**	**22 26**	**22 44**	**23 00**	**23 09**	**23 14**	**23 30**	**23 39**	**23 44**	**23 59**	**00 09**	**00 14**	
Stratford		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
London Liverpool Street	a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
West Ham		**20 44**	**20 31**	**21 05**	**20 49**	**21 14**	**21 01**	**21 35**	**21 19**	**21 44**	**21 31**	**21 49**	**22 05**	**22 14**	**22 35**	**22 19**	**22 44**	**22 31**	**22 49**	**23 05**	**23 14**	**23 19**	**23 35**	**23 44**	**23 49**	**00 05**	**00 14**	**00 19**	
Limehouse		**20 49**	**20 36**	**21 10**	**20 54**	**21 19**	**21 06**	**21 40**	**21 24**	**21 49**	**21 36**	**21 54**	**22 10**	**22 19**	**22 40**	**22 24**	**22 49**	**22 36**	**22 54**	**23 10**	**23 19**	**23 24**	**23 40**	**23 49**	**23 54**	**00 10**	**00 19**	**00 24**	
London Fenchurch Street	a	**20 54**	**20 41**	**21 15**	**20 59**	**21 24**	**21 11**	**21 45**	**21 29**	**21 54**	**21 41**	**21 59**	**22 15**	**22 24**	**22 45**	**22 29**	**22 54**	**22 41**	**22 59**	**23 15**	**23 24**	**23 29**	**23 45**	**23 54**	**23 59**	**00 15**	**00 24**	**00 29**	

West Horndon

Station Approach, West Horndon, Brentwood, Essex

Opening Hours:
Mon To Fri: 0615-2000
Sat: 0815-1700
Sun: 0000-0000
Sun: 0000-0000

TICKETING
Ticket Machines for purchasing on the day and pre purchased tickets are available. Oyster ticket Machines are not available.

ASSISTANCE AND ACCESS
Step free access is only available from street level if travelling towards Southend from platform 2. There is no lift or step free entrance to platform 1. Accessible ticket machines and an induction loop is available. Impaired mobility set down is available within the booking hall. National key toilets are available within the booking hall.

CYCLE RACKS
10 cycle racks are available in the station carpark or on Platform 2 (Shoeburyness bound).

ATTRACTIONS
West Horndon is a pretty village just on the outskirts of London it has three golf courses close to the station – South Essex Golf Centre, Thorndon Park Golf Course and Warley Park Golf Club. If a day on the links doesn't tickle your fancy then take a stroll around Barnards Farm Gardens where you can take in a Japanese garden, young woodland, formal gardens and some interesting sculptures.

DRINKS & DINING
This picturesque village has two notable restaurants. The first is a family run Italian establishment La Bicicletta where they source and serve local produce.The second is The Railway Hotel, which is just across from the station. This traditional Victorian pub serves real ale and a good Sunday lunch.

SHOPPING
Gardeners will love the Homefield Nursery and Town and Country Nursery and Landscapes. If you enjoy diving Nutty's dive Centre is the place to go. For more traditional high street shops hop on the train to Basildon for Eastgate Shopping Centre.

Additional Information

Passenger Services

Services		Information
	Staffing Level	Part-time
Unavailable	Left Luggage	
Available	Lost Property	Mon To Fri: 08:00 - 18:00
Available	CCTV	

Ticketing

Services		Information
Available	Ticket Machines	
Available	Ticket Office	Mon To Fri 06:15 - 20:00 Sat 08:15 - 17:00 Sun 00:00 - 00:00 Sun 00:00 - 00:00
Available	Collection of Pre Purchased Tickets	
Unavailable	Oyster Pre Paid	
Unavailable	Oyster Top Up	
Unavailable	Travelcard Area	

Facilities

Services		Information
Available	Seated Area	
Unavailable	Waiting Rooms	
Unavailable	Trolleys	
Available	Refreshment Facilities	
Available	Toilets	Within booking hall
Unavailable	Baby Changing	
Unavailable	Pay Phones	
Available	Post Box	
Unavailable	Tourist Information Office	
Unavailable	Shops	
Unavailable	Wifi	
Unavailable	Web Kiosk	
Unavailable	ATM Machine	

Accessibility

Services		Information
Unavailable	Helpline	01702 357 640 Mon To Fri : 08:00 - 18:00
Available	Customer Help Points	
Unavailable	Staff Help	
Unavailable	Accessible Ticket Office Counter	
Available	Induction Loop	
Available	Ramp for train access	
Unavailable	Accessible public telephones	
Available	National key toilets	Within booking hall
Available	Step free access coverage	Step free access is only available from street level if travelling towards Southend from platform 2. There is no lift or step free entrance to platform 1
Available	Impaired mobility set down	Outside station entrance
Available	Disabled parking	
Unavailable	Accessible taxis	
Unavailable	Wheelchairs	

Transport Links

Services		Information
Available	Cycle storage availability	
Available	Cycle storage CCTV	
	Cycle storage location	Car Park & Platform 2 (Shoeburyness bound)
Unavailable	Cycle storage sheltered	
Available	Cycle storage # spaces	10
	Cycle storage type	Stands
	Rail replacement services location	Outside station entrance in car park
Available	Taxi rank	No
Available	Bus services	Information to plan your onward journey is available in a printable format here.
Available	Metro services	
Unavailable	Airport services	
Available	Port services	
Unavailable	Car hire services	
Unavailable	Cycle hire	
Unavailable	Car Park: Station Car Park	

APPENDIX B

West Horndon Bus Services

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West Horndon - Grays
AMBER COACHES LTD

	Mondays to Fridays (hourly frequency)							
West Horndon, o/s Railway Station	0900	0957	1057	1157	1257	1357	1557	1657
Bulphan, Church	0908	1005	1105	1205	1305	1405	1605	1705
Bulphan, Recreation Ground	0909	1006	1106	1206	1306	1406	1606	1706
Orsett, Hospital	0918	1015	1115	1215	1315	1415	1615	1715
Orsett, Rectory Road	0919	1015	1115	1215	1315	1415	1615	1715
Orsett, Stanford Road	0920	1017	1117	1217	1317	1417	1617	1717
Socketts Heath, The Oak	0923	1020	1120	1220	1320	1420	1620	1720
Grays, Tennyson Avenue	0924	1021	1121	1221	1321	1421	1621	1721
Grays, Whitehall Road	0925	1022	1122	1222	1322	1422	1622	1722
Grays, Turps Corner	0927	1023	1123	1223	1323	1423	1623	1723
Grays, Bradleigh Avenue	0928	1024	1124	1224	1324	1424	1624	1724
Grays, Stanley Road	0929	1026	1126	1226	1326	1426	1626	1726
Grays, Bus Station (Bay 3)	0932	1028	1128	1228	1328	1428	1628	1728

Timetable effective from 17th March 2014

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West Horndon - Grays
AMBER COACHES LTD

Saturday (hourly frequency)

West Horndon, o/s Railway Station	0900	0957	1057	1157	1257	1357	1557	1657
Bulphan, Church	0908	1005	1105	1205	1305	1405	1605	1705
Bulphan, Recreation Ground	0909	1006	1106	1206	1306	1406	1606	1706
Orsett, Hospital	0918	1015	1115	1215	1315	1415	1615	1715
Orsett, Rectory Road	0919	1015	1115	1215	1315	1415	1615	1715
Orsett, Stanford Road	0920	1017	1117	1217	1317	1417	1617	1717
Socketts Heath, The Oak	0923	1020	1120	1220	1320	1420	1620	1720
Grays, Tennyson Avenue	0924	1021	1121	1221	1321	1421	1621	1721
Grays, Whitehall Road	0925	1022	1122	1222	1322	1422	1622	1722
Grays, Turps Corner	0927	1023	1123	1223	1323	1423	1623	1723
Grays, Bradleigh Avenue	0928	1024	1124	1224	1324	1424	1624	1724
Grays, Stanley Road	0929	1026	1126	1226	1326	1426	1626	1726
Grays, Bus Station (Bay 3)	0932	1028	1128	1228	1328	1428	1628	1728

Timetable effective from 17th March 2014

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Grays - West Horndon

AMBER COACHES LTD

Mondays to Fridays (hourly frequency)

Grays, Bus Station (Bay 8)	0935	1035	1135	1235	1335	1535	1635	1735
Grays, Stanley Road	0936	1036	1136	1236	1336	1536	1636	1736
Grays, Bradleigh Avenue	0937	1037	1137	1237	1337	1537	1637	1737
Grays, Turps Corner	0938	1038	1138	1238	1338	1538	1638	1738
Grays, Whitehall Road	0939	1039	1139	1239	1339	1539	1639	1739
Grays, Tennyson Avenue	0940	1040	1140	1240	1340	1540	1640	1740
Grays, Piggs Corner	0941	1041	1141	1241	1341	1541	1641	1741
Socketts Heath, The Oak)	0942	1042	1142	1242	1342	1542	1642	1742
Orsett, Stanford Road	0945	1045	1145	1245	1345	1545	1645	1745
Orsett, Rectory Road	0946	1046	1146	1246	1346	1546	1646	1746
Orsett, Hospital	0947	1047	1147	1247	1347	1547	1647	1747
Bulphan, Bulphan Motel	0953	1053	1153	1253	1353	1553	1653	1753
West Horndon, opp Clavering Gardens	0956	1056	1156	1256	1356	1556	1656	1756
West Horndon, o/s Railway Station	0957	1057	1157	1257	1357	1557	1657	1757

Timetable effective from 17th March 2014

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Grays - West Horndon

AMBER COACHES LTD

Saturdays (hourly frequency)

Grays, Bus Station (Bay 8)	0935	1035	1135	1235	1335	1535	1635	1735
Grays, Stanley Road	0936	1036	1136	1236	1336	1536	1636	1736
Grays, Bradleigh Avenue	0937	1037	1137	1237	1337	1537	1637	1737
Grays, Turps Corner	0938	1038	1138	1238	1338	1538	1638	1738
Grays, Whitehall Road	0939	1039	1139	1239	1339	1539	1639	1739
Grays, Tennyson Avenue	0940	1040	1140	1240	1340	1540	1640	1740
Grays, Piggs Corner	0941	1041	1141	1241	1341	1541	1641	1741
Socketts Heath, The Oak)	0942	1042	1142	1242	1342	1542	1642	1742
Orsett, Stanford Road	0945	1045	1145	1245	1345	1545	1645	1745
Orsett, Rectory Road	0946	1046	1146	1246	1346	1546	1646	1746
Orsett, Hospital	0947	1047	1147	1247	1347	1547	1647	1747
Bulphan, Bulphan Motel	0953	1053	1153	1253	1353	1553	1653	1753
West Horndon, opp Clavering Gardens	0956	1056	1156	1256	1356	1556	1656	1756
West Horndon, o/s Railway Station	0957	1057	1157	1257	1357	1557	1657	1757

Timetable effective from 17th March 2014

SERVICE 477 - West Hordon - Ingrave

NIBSbuses.com

Schooldays Only	AM	PM
West Hordon Rail Station	**07:50**	**15:52**
West Hordon Clavering Gardens	**07:51**	**15:51**
Ingrave Road	**08:00**	**15:42**
Brentwood County High School	**08:15**	**15:30**

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565 Brentwood Station - Herongate - West Horndon - Bulphan

Regal Busways

The information on this timetable is expected to be valid until at least 28th January 2015. Where we know of variations, before or after this date, then we show these at the top of each affected column in the table.

Direction of stops: where shown (eg: W-bound) this is the compass direction towards which the bus is pointing when it stops

Mondays to Fridays

Service Restrictions	1	2	1	2	2	1						1	2	2	1		
Notes	Sch	NSch	Sch	NSch	NSch	Sch						Sch	NSch	NSch	Sch		
Bulphan, Recreation Ground (W-bound)	—	—	0742	0802	0907	0907	—	1057	—	1303	—	—	—	1603	1603	—	1811
West Horndon, opp Railway Station	—	—	0750	0810	0915	0915	—	1105	—	|	—	—	—	|	|	—	|
Bulphan, Bulphan Motel (N-bound)	—	—	|	|	|	|	—	|	—	1306	—	—	—	1606	1606	—	1814
West Horndon, opp Dunton Hills Farm	—	—	0753	0813	0918	0918	—	1108	—	1308	—	—	—	1608	1608	—	1816
Herongate, opp The Green Man	0700	0715	0758	0818	0923	0923	1013	1113	1213	1313	1405	1455	1455	1615	1615	1700	1821
Brentwood, o/s Council Offices	0707	0722	0812	0828	0930	0930	1020	1120	1220	1320	1412	1502	1502	1623	1623	1708	1828
Brentwood, opp St Helen's School	|	|	0825	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Brentwood, High Street (Stop E)	0710	0725	—	0833	0933	0933	1023	1123	1223	1323	1415	1505	1505	1627	1627	1712	1831
Brentwood, o/s Brentwood Railway Station	0715	0730	—	0838	0938	0938	1028	1128	1228	1328	1420	—	1510	1633	1633	1718	1836

Saturdays

Bulphan, Recreation Ground (W-bound)	0807	0907	—	1057	—	1303	—	—	1603	—	1801
West Horndon, opp Railway Station	0815	0915	—	1105	—	|	—	—	|	—	|
Bulphan, Bulphan Motel (N-bound)	|	|	—	|	—	1305	—	—	1606	—	1804
West Horndon, opp Dunton Hills Farm	0818	0918	—	1108	—	1308	—	—	1608	—	1808
Herongate, opp The Green Man	0823	0923	1013	1113	1213	1313	1413	1503	1613	1705	—
Brentwood, o/s Council Offices	0830	0930	1020	1120	1220	1320	1420	1510	1620	1712	—
Brentwood, High Street (Stop E)	0833	0933	1023	1123	1223	1323	1423	1513	1623	1715	—
Brentwood, o/s Brentwood Railway Station	0838	0938	1028	1128	1228	1328	1428	1518	1628	1720	—

Sundays

no service

Fri 2 Jan

Notes	NSch	NSch	NSch						NSch	NSch		
Bulphan, Recreation Ground (W-bound)	—	0802	0907	—	1057	—	1303	—	—	1603	—	1811
West Horndon, opp Railway Station	—	0810	0915	—	1105	—	|	—	—	|	—	|
Bulphan, Bulphan Motel (N-bound)	—	|	|	—	|	—	1306	—	—	1606	—	1814
West Horndon, opp Dunton Hills Farm	—	0813	0918	—	1108	—	1308	—	—	1608	—	1816
Herongate, opp The Green Man	0715	0818	0923	1013	1113	1213	1313	1405	1455	1615	1700	1821
Brentwood, o/s Council Offices	0722	0828	0930	1020	1120	1220	1320	1412	1502	1623	1708	1828
Brentwood, High Street (Stop E)	0725	0833	0933	1023	1123	1223	1323	1415	1505	1627	1712	1831
Brentwood, o/s Brentwood Railway Station	0730	0838	0938	1028	1128	1228	1328	1420	1510	1633	1718	1836

Service Restrictions: **1** - not 16.2.15 to 20.2., 30.3. to 10.4.
2 - only 16.2.15 to 20.2., 30.3. to 10.4.

Notes: **NSch** - Not Schooldays
Sch - Schooldays only

565 Bulphan - West Horndon - Herongate - Brentwood Station

Regal Busways

The information on this timetable is expected to be valid until at least 28th January 2015. Where we know of variations, before or after this date, then we show these at the top of each affected column in the table.

Direction of stops: where shown (eg: W-bound) this is the compass direction towards which the bus is pointing when it stops

Mondays to Fridays

Service Restrictions	1	2	2	1						2	1	2	1			
Notes	Sch	NSch	NSch	Sch						NSch	Sch	NSch	Sch			
Brentwood, opp Brentwood Railway Station	0717	0737	0840	0842	0945	1030	1145	1230	1345	1430	1435	1532	—	1640	1740	1845
Brentwood, High Street (Stop C)	0722	0742	0845	0847	0950	1035	1150	1235	1350	1440	1440	1537	—	1645	1745	1850
Brentwood, opp St Helen's School	|	|	|	|	|	|	|	|	|	|	|	|	1531	|	|	|
Brentwood, opp Council Offices	0725	0745	0848	0848	0953	1038	1153	1238	1353	1443	1443	1540	1540	1648	1748	1853
Herongate, o/s The Green Man	0732	0752	0855	0855	|	1045	|	1245	|	|	|	1547	1547	|	1755	|
Herongate, opp The Green Man	|	|	|	|	1000	|	1200	|	1400	1450	1450	|	|	1655	|	1900
West Horndon, o/s Dunton Hills Farm	0737	0757	0900	0900	—	1050	—	1250	—	—	—	1552	1552	—	1800	—
Bulphan, Bulphan Motel (S-bound)	0739	0759	0902	0902	—	1052	—	|	—	—	—	|	|	—	|	—
Bulphan, Recreation Ground (W-bound)	0742	0802	0905	0905	—	1055	—	|	—	—	—	|	|	—	|	—
West Horndon, o/s Railway Station	—	—	—	—	—	—	—	1253	—	—	—	1555	1555	—	1803	—
Bulphan, Recreation Ground (E-bound)	—	—	—	—	—	—	—	1301	—	—	—	1603	1603	—	1811	—

Saturdays

Brentwood, opp Brentwood Railway Station	—	0840	0945	1030	1145	1230	1345	1435	1532	1635	1730
Brentwood, High Street (Stop C)	—	0845	0950	1035	1150	1235	1350	1440	1537	1640	1735
Brentwood, opp St Helen's School	—	0846	|	1036	|	|	|	|	|	|	|
Brentwood, opp Council Offices	—	0848	0953	1038	1153	1238	1353	1443	1540	1643	1738
Herongate, o/s The Green Man	—	0855	|	1045	|	1245	|	|	1547	|	1745
Herongate, opp The Green Man	—	|	1000	|	1200	|	1400	1450	|	1650	|
West Horndon, o/s Dunton Hills Farm	0802	0900	—	1050	—	1250	—	—	1552	—	1750
Bulphan, Bulphan Motel (S-bound)	0804	0902	—	1052	—	|	—	—	|	—	|
Bulphan, Recreation Ground (W-bound)	0807	0905	—	1056	—	|	—	—	|	—	|
West Horndon, o/s Railway Station	—	—	—	—	—	1253	—	—	1555	—	1753
Bulphan, Recreation Ground (E-bound)	—	—	—	—	—	1301	—	—	1603	—	1801

Sundays

no service

Fri 2 Jan

Notes	NSch	NSch						NSch	NSch			
Brentwood, opp Brentwood Railway Station	0737	0840	0945	1030	1145	1230	1345	1430	1532	1640	1740	1845
Brentwood, High Street (Stop C)	0742	0845	0950	1035	1150	1235	1350	1440	1537	1645	1745	1850
Brentwood, opp Council Offices	0745	0848	0953	1038	1153	1238	1353	1443	1540	1648	1748	1853
Herongate, o/s The Green Man	0752	0855	|	1045	|	1245	|	|	1547	|	1755	|
Herongate, opp The Green Man	|	|	1000	|	1200	|	1400	1450	|	1655	|	1900
West Horndon, o/s Dunton Hills Farm	0757	0900	—	1050	—	1250	—	—	1552	—	1800	—
Bulphan, Bulphan Motel (S-bound)	0759	0902	—	1052	—	|	—	—	|	—	|	—
Bulphan, Recreation Ground (W-bound)	0802	0905	—	1055	—	|	—	—	|	—	|	—
West Horndon, o/s Railway Station	—	—	—	—	—	1253	—	—	1555	—	1803	—
Bulphan, Recreation Ground (E-bound)	—	—	—	—	—	1301	—	—	1603	—	1811	—

Service Restrictions:
1 - not 16.2.15 to 20.2., 30.3. to 10.4.
2 - only 16.2.15 to 20.2., 30.3. to 10.4.

Notes:
NSch - Not Schooldays
Sch - Schooldays only

565 Brentwood Station - Herongate - West Horndon - Bulphan

Regal Busways

For times of the next departures from a particular stop you can use **traveline-txt** - by sending the SMS code to **84268**. Add the service number after the code if you just want a specific service - eg: **buctdgtd 60**. The return message from **traveline-txt** will show the next three departures, and it currently costs 25p plus any message sending charge. However it is free for all stops in Lincolnshire & in the SW region. Departure times will be real-time predictions where available, or scheduled departure times if not.

You can also get the same information by using the SMS code at www.nextbuses.mobi (only normal browsing charges apply) or through several iPhone or Android apps that offer access to **NextBuses**.

NOTE: SMS codes are different in each direction. Make sure you choose the right direction from these lists.

SMS Code	Stop Name	Street	ATCO Code
thuatmj	Bulphan, Recreation Ground (W-bound)	Church Road	1590036501
esxawdtd	West Horndon, opp Railway Station	Station Road	1500IM556
esxawdpw	West Horndon, adj Clavering Gardens	Station Road	1500WSTHORN1
thuajp	Bulphan, Bulphan Motel (N-bound)	Bulphan By Pass	15907075119
esxawdpt	West Horndon, opp Dunton Hills Farm	Tilbury Road	150006013004
esxawdpg	East Horndon, adj Halfway House	Tilbury Road	150006013001
esxawdpd	Herongate, o/s Thorndon Country Park	Brentwood Road	150006012011
esxawdpa	Herongate, opp The Green Man	Brentwood Road	1500IM2043
esxawdmt	Ingrave, adj Thorndon Approach	Brentwood Road	150006012008
esxawdmj	Ingrave, o/s School	Brentwood Road	150006012006
esxawdmd	Ingrave, o/s Church	Brentwood Road	1500IM1441B
esxawdma	Ingrave, o/s Thorndon Park Gates	Brentwood Road	150006012003
esxawdjt	Ingrave, adj Common Road	Brentwood Road	150006012001
esxgajaj	Brentwood, adj The Avenue	Ingrave Road	150037010008
esxgpwdm	Brentwood, opp Masons	Ingrave Road	1500370100Y7
esxgajad	Brentwood, adj Bridge Close	Ingrave Road	150037010006
esxgpwaw	Brentwood, opp Hogarth Avenue	Ingrave Road	1500370100Y5
esxgagwp	Brentwood, adj Shenfield Common	Ingrave Road	150037010004
esxgagwj	Brentwood, o/s Council Offices	Ingrave Road	150037010002
esxjgjad	Brentwood, adj Queen's Road	A128	1500IM198C
esxadgwd	Brentwood, opp St Helen's School	Sawyers Hall Lane	1500IM980
esxgmtjm	Brentwood, High Street (Stop E)	High Street	1500DGK173
esxgadwd	Brentwood, Crown Street (Stop J)	High Street	150037002005
esxgajdt	Brentwood, adj Queens Road Rbt	Kings Road	150037009001
esxgajga	Brentwood, o/s Brentwood Railway Station	Kings Road	1500IM439B

565 Bulphan - West Horndon - Herongate - Brentwood Station

Regal Busways

For times of the next departures from a particular stop you can use **traveline-txt** - by sending the SMS code to **84268**. Add the service number after the code if you just want a specific service - eg: **buctdgtd 60**. The return message from **traveline-txt** will show the next three departures, and it currently costs 25p plus any message sending charge. However it is free for all stops in Lincolnshire & in the SW region. Departure times will be real-time predictions where available, or scheduled departure times if not.

You can also get the same information by using the SMS code at www.nextbuses.mobi (only normal browsing charges apply) or through several iPhone or Android apps that offer access to **NextBuses**.

NOTE: SMS codes are different in each direction. Make sure you choose the right direction from these lists.

SMS Code	Stop Name	Street	ATCO Code
esxgajgd	Brentwood, opp Brentwood Railway Station	Kings Road	1500IM439
esxgajdw	Brentwood, opp Queens Road Rbt	Kings Road	150037006001
esxgadwg	Brentwood, Crown Street (Stop K)	High Street	150037002006
esxgadwm	Brentwood, High Street (Stop C)	High Street	150037002008
esxadgwd	Brentwood, opp St Helen's School	Sawyers Hall Lane	1500IM980
esxgagwg	Brentwood, Wilsons Corner (SE-bound)	Ingrave Road	1500IM981
esxgagwm	Brentwood, opp Council Offices	Ingrave Road	1500IM981B
esxgpmgp	Brentwood, opp Shenfield Common	Ingrave Road	1500370100Y4
esxgagwt	Brentwood, adj Hogarth Avenue	Ingrave Road	150037010005
esxjamdw	Brentwood, opp Bridge Close	Ingrave Road	150037010Y06
esxgajag	Brentwood, o/s Masons	Ingrave Road	150037010007
esxgpmjm	Brentwood, opp The Avenue	Ingrave Road	1500370100Y8
esxawdjw	Ingrave, opp Thorndon Park Gates	Brentwood Road	150006012002
esxawdmg	Ingrave, opp Church	Brentwood Road	1500IM1441
esxawdmp	Ingrave, opp School	Brentwood Road	150006012007
esxawdmw	Ingrave, opp Thorndon Approach	Brentwood Road	150006012009
esxadwdw	Herongate, o/s The Green Man	Brentwood Road	1500IM210
esxawdpa	Herongate, opp The Green Man	Brentwood Road	1500IM2043
esxgpmaw	Herongate, opp Thorndon Country Park	Brentwood Road	1500060120Y1
esxawdpj	East Horndon, opp Halfway House	Tilbury Road	1500IM2044
esxawdpm	West Horndon, o/s Dunton Hills Farm	Tilbury Road	1500WSTHORN2
thuajt	Bulphan, Bulphan Motel (S-bound)	Bulphan by pass	15907075120
thuatmj	Bulphan, Recreation Ground (W-bound)	Church Road	1590036501
esxawdtg	West Horndon, o/s Railway Station	Station Road	150006013008
thudmap	Bulphan, Church (E-bound)	Church Road	1590036401
thuatmp	Bulphan, Recreation Ground (E-bound)	Church Road	1590036601

APPENDIX C

TRICS Output Files

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	1 days
04	EAST ANGLIA		
	SF	SUFFOLK	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NE	NORTH EAST LINCOLNSHIRE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	230 to 432 (units:)
Range Selected by User:	200 to 491 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/06 to 12/05/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	3 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	3

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	2
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C3	3 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

10,001 to 15,000	1 days
15,001 to 20,000	1 days
20,001 to 25,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

50,001 to 75,000	1 days
125,001 to 250,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	3 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1	EX-03-A-01	SEMI-DET.	ESSEX
	MILTON ROAD		
	CORRINGHAM		
	STANFORD-LE-HOPE		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	237	
	Survey date: TUESDAY	13/05/08	Survey Type: MANUAL
2	NE-03-A-02	SEMI DETACHED & DETACHED	NORTH EAST LINCOLNSHIRE
	HANOVER WALK		
	SCUNTHORPE		
	Edge of Town		
	No Sub Category		
	Total Number of dwellings:	432	
	Survey date: MONDAY	12/05/14	Survey Type: MANUAL
3	SF-03-A-02	SEMI DET./TERRACED	SUFFOLK
	STOKE PARK DRIVE		
	MAIDENHALL		
	IPSWICH		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	230	
	Survey date: THURSDAY	24/05/07	Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.085	3	300	0.265	3	300	0.350
08:00 - 09:00	3	300	0.141	3	300	0.434	3	300	0.575
09:00 - 10:00	3	300	0.161	3	300	0.171	3	300	0.332
10:00 - 11:00	3	300	0.143	3	300	0.191	3	300	0.334
11:00 - 12:00	3	300	0.167	3	300	0.150	3	300	0.317
12:00 - 13:00	3	300	0.178	3	300	0.179	3	300	0.357
13:00 - 14:00	3	300	0.156	3	300	0.165	3	300	0.321
14:00 - 15:00	3	300	0.185	3	300	0.189	3	300	0.374
15:00 - 16:00	3	300	0.360	3	300	0.250	3	300	0.610
16:00 - 17:00	3	300	0.320	3	300	0.201	3	300	0.521
17:00 - 18:00	3	300	0.362	3	300	0.214	3	300	0.576
18:00 - 19:00	3	300	0.307	3	300	0.227	3	300	0.534
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.565			2.636			5.201

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TAXIS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.004	3	300	0.002	3	300	0.006
08:00 - 09:00	3	300	0.003	3	300	0.006	3	300	0.009
09:00 - 10:00	3	300	0.003	3	300	0.002	3	300	0.005
10:00 - 11:00	3	300	0.006	3	300	0.007	3	300	0.013
11:00 - 12:00	3	300	0.002	3	300	0.002	3	300	0.004
12:00 - 13:00	3	300	0.001	3	300	0.002	3	300	0.003
13:00 - 14:00	3	300	0.002	3	300	0.000	3	300	0.002
14:00 - 15:00	3	300	0.003	3	300	0.003	3	300	0.006
15:00 - 16:00	3	300	0.002	3	300	0.001	3	300	0.003
16:00 - 17:00	3	300	0.003	3	300	0.002	3	300	0.005
17:00 - 18:00	3	300	0.003	3	300	0.002	3	300	0.005
18:00 - 19:00	3	300	0.002	3	300	0.001	3	300	0.003
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.034			0.030			0.064

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL OGVS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.006	3	300	0.006	3	300	0.012
08:00 - 09:00	3	300	0.000	3	300	0.000	3	300	0.000
09:00 - 10:00	3	300	0.000	3	300	0.001	3	300	0.001
10:00 - 11:00	3	300	0.001	3	300	0.002	3	300	0.003
11:00 - 12:00	3	300	0.000	3	300	0.001	3	300	0.001
12:00 - 13:00	3	300	0.003	3	300	0.004	3	300	0.007
13:00 - 14:00	3	300	0.003	3	300	0.004	3	300	0.007
14:00 - 15:00	3	300	0.002	3	300	0.002	3	300	0.004
15:00 - 16:00	3	300	0.001	3	300	0.001	3	300	0.002
16:00 - 17:00	3	300	0.003	3	300	0.000	3	300	0.003
17:00 - 18:00	3	300	0.000	3	300	0.000	3	300	0.000
18:00 - 19:00	3	300	0.000	3	300	0.000	3	300	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.019			0.021			0.040

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PSVS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.000	3	300	0.000	3	300	0.000
08:00 - 09:00	3	300	0.000	3	300	0.000	3	300	0.000
09:00 - 10:00	3	300	0.000	3	300	0.000	3	300	0.000
10:00 - 11:00	3	300	0.000	3	300	0.000	3	300	0.000
11:00 - 12:00	3	300	0.000	3	300	0.000	3	300	0.000
12:00 - 13:00	3	300	0.000	3	300	0.000	3	300	0.000
13:00 - 14:00	3	300	0.000	3	300	0.000	3	300	0.000
14:00 - 15:00	3	300	0.000	3	300	0.000	3	300	0.000
15:00 - 16:00	3	300	0.000	3	300	0.000	3	300	0.000
16:00 - 17:00	3	300	0.000	3	300	0.000	3	300	0.000
17:00 - 18:00	3	300	0.000	3	300	0.000	3	300	0.000
18:00 - 19:00	3	300	0.000	3	300	0.000	3	300	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL CYCLISTS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.004	3	300	0.008	3	300	0.012
08:00 - 09:00	3	300	0.003	3	300	0.008	3	300	0.011
09:00 - 10:00	3	300	0.002	3	300	0.000	3	300	0.002
10:00 - 11:00	3	300	0.000	3	300	0.003	3	300	0.003
11:00 - 12:00	3	300	0.004	3	300	0.004	3	300	0.008
12:00 - 13:00	3	300	0.008	3	300	0.004	3	300	0.012
13:00 - 14:00	3	300	0.003	3	300	0.006	3	300	0.009
14:00 - 15:00	3	300	0.004	3	300	0.003	3	300	0.007
15:00 - 16:00	3	300	0.021	3	300	0.021	3	300	0.042
16:00 - 17:00	3	300	0.009	3	300	0.007	3	300	0.016
17:00 - 18:00	3	300	0.011	3	300	0.014	3	300	0.025
18:00 - 19:00	3	300	0.016	3	300	0.011	3	300	0.027
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.085			0.089			0.174

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLE OCCUPANTS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.096	3	300	0.311	3	300	0.407
08:00 - 09:00	3	300	0.181	3	300	0.655	3	300	0.836
09:00 - 10:00	3	300	0.196	3	300	0.235	3	300	0.431
10:00 - 11:00	3	300	0.185	3	300	0.251	3	300	0.436
11:00 - 12:00	3	300	0.204	3	300	0.198	3	300	0.402
12:00 - 13:00	3	300	0.222	3	300	0.219	3	300	0.441
13:00 - 14:00	3	300	0.201	3	300	0.209	3	300	0.410
14:00 - 15:00	3	300	0.242	3	300	0.245	3	300	0.487
15:00 - 16:00	3	300	0.573	3	300	0.356	3	300	0.929
16:00 - 17:00	3	300	0.463	3	300	0.290	3	300	0.753
17:00 - 18:00	3	300	0.459	3	300	0.284	3	300	0.743
18:00 - 19:00	3	300	0.409	3	300	0.334	3	300	0.743
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.431			3.587			7.018

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PEDESTRIANS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.038	3	300	0.070	3	300	0.108
08:00 - 09:00	3	300	0.059	3	300	0.146	3	300	0.205
09:00 - 10:00	3	300	0.050	3	300	0.067	3	300	0.117
10:00 - 11:00	3	300	0.040	3	300	0.038	3	300	0.078
11:00 - 12:00	3	300	0.042	3	300	0.042	3	300	0.084
12:00 - 13:00	3	300	0.039	3	300	0.030	3	300	0.069
13:00 - 14:00	3	300	0.033	3	300	0.034	3	300	0.067
14:00 - 15:00	3	300	0.062	3	300	0.057	3	300	0.119
15:00 - 16:00	3	300	0.215	3	300	0.081	3	300	0.296
16:00 - 17:00	3	300	0.088	3	300	0.046	3	300	0.134
17:00 - 18:00	3	300	0.066	3	300	0.065	3	300	0.131
18:00 - 19:00	3	300	0.060	3	300	0.059	3	300	0.119
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.792			0.735			1.527

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL BUS/TRAM PASSENGERS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.000	3	300	0.007	3	300	0.007
08:00 - 09:00	3	300	0.004	3	300	0.013	3	300	0.017
09:00 - 10:00	3	300	0.006	3	300	0.013	3	300	0.019
10:00 - 11:00	3	300	0.002	3	300	0.008	3	300	0.010
11:00 - 12:00	3	300	0.003	3	300	0.010	3	300	0.013
12:00 - 13:00	3	300	0.010	3	300	0.008	3	300	0.018
13:00 - 14:00	3	300	0.009	3	300	0.001	3	300	0.010
14:00 - 15:00	3	300	0.007	3	300	0.002	3	300	0.009
15:00 - 16:00	3	300	0.012	3	300	0.010	3	300	0.022
16:00 - 17:00	3	300	0.023	3	300	0.003	3	300	0.026
17:00 - 18:00	3	300	0.018	3	300	0.012	3	300	0.030
18:00 - 19:00	3	300	0.003	3	300	0.001	3	300	0.004
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.097			0.088			0.185

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL RAIL PASSENGERS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.000	3	300	0.000	3	300	0.000
08:00 - 09:00	3	300	0.000	3	300	0.000	3	300	0.000
09:00 - 10:00	3	300	0.000	3	300	0.000	3	300	0.000
10:00 - 11:00	3	300	0.000	3	300	0.000	3	300	0.000
11:00 - 12:00	3	300	0.000	3	300	0.000	3	300	0.000
12:00 - 13:00	3	300	0.000	3	300	0.000	3	300	0.000
13:00 - 14:00	3	300	0.000	3	300	0.000	3	300	0.000
14:00 - 15:00	3	300	0.000	3	300	0.000	3	300	0.000
15:00 - 16:00	3	300	0.000	3	300	0.000	3	300	0.000
16:00 - 17:00	3	300	0.000	3	300	0.000	3	300	0.000
17:00 - 18:00	3	300	0.000	3	300	0.000	3	300	0.000
18:00 - 19:00	3	300	0.000	3	300	0.000	3	300	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL COACH PASSENGERS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.000	3	300	0.000	3	300	0.000
08:00 - 09:00	3	300	0.000	3	300	0.000	3	300	0.000
09:00 - 10:00	3	300	0.000	3	300	0.000	3	300	0.000
10:00 - 11:00	3	300	0.000	3	300	0.000	3	300	0.000
11:00 - 12:00	3	300	0.000	3	300	0.000	3	300	0.000
12:00 - 13:00	3	300	0.000	3	300	0.000	3	300	0.000
13:00 - 14:00	3	300	0.000	3	300	0.000	3	300	0.000
14:00 - 15:00	3	300	0.000	3	300	0.000	3	300	0.000
15:00 - 16:00	3	300	0.000	3	300	0.000	3	300	0.000
16:00 - 17:00	3	300	0.000	3	300	0.000	3	300	0.000
17:00 - 18:00	3	300	0.000	3	300	0.000	3	300	0.000
18:00 - 19:00	3	300	0.000	3	300	0.000	3	300	0.000
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.000			0.000			0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.000	3	300	0.007	3	300	0.007
08:00 - 09:00	3	300	0.004	3	300	0.013	3	300	0.017
09:00 - 10:00	3	300	0.006	3	300	0.013	3	300	0.019
10:00 - 11:00	3	300	0.002	3	300	0.008	3	300	0.010
11:00 - 12:00	3	300	0.003	3	300	0.010	3	300	0.013
12:00 - 13:00	3	300	0.010	3	300	0.008	3	300	0.018
13:00 - 14:00	3	300	0.009	3	300	0.001	3	300	0.010
14:00 - 15:00	3	300	0.007	3	300	0.002	3	300	0.009
15:00 - 16:00	3	300	0.012	3	300	0.010	3	300	0.022
16:00 - 17:00	3	300	0.023	3	300	0.003	3	300	0.026
17:00 - 18:00	3	300	0.018	3	300	0.012	3	300	0.030
18:00 - 19:00	3	300	0.003	3	300	0.001	3	300	0.004
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.097			0.088			0.185

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	300	0.138	3	300	0.396	3	300	0.534
08:00 - 09:00	3	300	0.248	3	300	0.822	3	300	1.070
09:00 - 10:00	3	300	0.254	3	300	0.315	3	300	0.569
10:00 - 11:00	3	300	0.227	3	300	0.300	3	300	0.527
11:00 - 12:00	3	300	0.254	3	300	0.255	3	300	0.509
12:00 - 13:00	3	300	0.279	3	300	0.261	3	300	0.540
13:00 - 14:00	3	300	0.247	3	300	0.250	3	300	0.497
14:00 - 15:00	3	300	0.316	3	300	0.307	3	300	0.623
15:00 - 16:00	3	300	0.821	3	300	0.468	3	300	1.289
16:00 - 17:00	3	300	0.583	3	300	0.346	3	300	0.929
17:00 - 18:00	3	300	0.554	3	300	0.375	3	300	0.929
18:00 - 19:00	3	300	0.488	3	300	0.405	3	300	0.893
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			4.409			4.500			8.909

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	230 - 432 (units:)
Survey date date range:	01/01/06 - 12/05/14
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX D

DMRB TA79/99 Traffic Capacity of Urban Roads

VOLUME 5 ASSESSMENT AND PREPARATION OF ROAD SCHEMES
SECTION 1 PREPARATION AND IMPLEMENTATION

PART 3

TA 79/99 AMENDMENT NO 1

TRAFFIC CAPACITY OF URBAN ROADS

SUMMARY

Advice Note TA 79/99, published February 1999, was wrongly placed in Section 2 of DMRB Volume 5. All users should arrange for the document TA 79/99 to be inserted in Volume 5, Section 1, Part 3 of DMRB. References within the document to Section 2, Part 2 should also be corrected accordingly.

INSTRUCTIONS FOR USE

1. Remove Advice Note TA 79/99 from Volume 3 of the DMRB.

2. Amend the volume references on all pages of TA 79/99 to read Volume 5, Section 1, Part 3 of DMRB.

3. Remove existing title page and insert amended title page and Note to Users in front of Contents sheet of TA 79/99.

4. Enter the details of the amendment on the Registration of Amendment sheet, sign and date to confirm that the amendment has been incorporated.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.

DESIGN MANUAL FOR ROADS AND BRIDGES

TA 79/99
Incorporating
Amendment No 1
dated May 1999

THE HIGHWAYS AGENCY

THE SCOTTISH OFFICE DEVELOPMENT DEPARTMENT

THE WELSH OFFICE
Y SWYDDFA GYMREIG

THE DEPARTMENT OF THE ENVIRONMENT FOR NORTHERN IRELAND

Traffic Capacity of Urban Roads

Summary: Advice Note TA 79/99, published February 1999, was wrongly placed in Section 2 of DMRB Volume 5.

2. GENERAL PRINCIPLES

Application of Capacity values

2.1 The guidance in this document should be used flexibly. In some circumstances, the use of a reduced width of carriageway will result in significant savings or environmental benefits, which outweigh the disbenefits of congestion during peak periods.

2.2 The capacity of urban roads can be affected by a wide range of factors that may not always be accurately predicted by the road features identified. For this reason capacity flows may be up to 10% more or less than the values given in this document.

Features Affecting Capacity

2.3 The potential capacity of a link will not be reached if either the capacity of junctions along the link or the capacity of the adjoining network is lower than the link in question. The flow on an urban road may also be affected by turning movements restricting the mainline capacity. Such constraints should be identified at an early stage.

2.4 Urban roads normally have higher flows in the morning and evening peaks than at other times of day. Improving features that affect the capacity would help prevent congestion during these periods.

2.5 The flows given in the tables are the maximum that typical urban roads can carry consistently in an hour. The principal factors that may affect flow levels on urban roads are given in Table 1.
For motorways the prime determinant is the carriageway width, but for all-purpose roads flow is also affected by the speed limit, the frequency of side roads, the degree of parking and loading, the frequency of at grade pedestrian crossings, bus stops, and accesses.

2.6 The capacity of the lower width roads will be significantly reduced by parking and temporary width restrictions caused by such activities as maintenance and Statutory Undertakers' Works. The lowest widths are unlikely to be suitable for bus routes or for significant volumes of heavy goods vehicles.

2.7 Roads in Category UAP3 and UAP4 may carry high proportions of local traffic, resulting in an increase in turning movements at junctions and accesses.

2.8 Capacity will also be affected by prevailing weather and night conditions. The capacities shown are for “favourable” daylight conditions.

Feature	ROAD TYPE				
	Urban Motorway	Urban All-purpose			
	UM	UAP1	UAP2	UAP3	UAP4
General Description	Through route with grade separated junctions, hardshoulders or hardstrips, and motorway restrictions.	High standard single/dual carriageway road carrying predominantly through traffic with limited access.	Good standard single/dual carriageway road with frontage access and more than two side roads per km.	Variable standard road carrying mixed traffic with frontage access, side roads, bus stops and at-grade pedestrian crossings.	Busy high street carrying predominantly local traffic with frontage activity including loading and unloading.
Speed Limit	60mph or less	40 to 60 mph for dual, & generally 40mph for single carriageway	Generally 40 mph	30 mph to 40 mph	30mph
Side Roads	None	0 to 2 per km	more than 2 per km	more than 2 per km	more than 2 per km
Access to roadside development	None. Grade separated for major only.	limited access	access to residential properties	frontage access	unlimited access to houses, shops & businesses
Parking and loading	none	restricted	restricted	unrestricted	unrestricted
Pedestrian crossings	grade separated	mostly grade separated	some at-grade	some at-grade	frequent at-grade
Bus stops	none	in lay-bys	at kerbside	at kerbside	at kerbside

Table 1 Types of Urban roads and the features that distinguish them

3. DETERMINATION OF URBAN ROAD CAPACITY

3.1 Table 1 sets out the types of Urban Roads and the features that distinguish between them and affect their traffic capacity. Tables 2 & 3 give the flow capacity for each road type described in Table 1.

3.2 Table 4 gives the adjustments when the proportion of heavy vehicles in a one way flow exceeds 15%. A heavy vehicle is defined in this context as OGV1, OGV2 or Buses and Coaches as given in the COBA Manual (DMRB 13.1 Part 4, Chapter 8).

3.3 The flows for road type UM in Table 2 apply to urban motorways where junctions are closely spaced giving weaving lengths of less than 1 kilometre. Urban motorways with layout and junction spacing similar to rural motorways can carry higher flows and TA46/97 "Traffic Flow Ranges for Use in the Assessment of New Rural Roads" will be more applicable.

3.4 Flows for single carriageways are based upon a 60/40 directional split in the flow. The one-way flows shown in Table 2 represent the busiest flow 60% figure.

3.5 The capacities shown apply to gradients of up to 5-6%. Special consideration should be made for steeper gradients, which would reduce capacity.

3.6 On-road parking reduces the effective road width and disrupts flow, e.g. where parking restrictions are not applied on road type UAP2 the flows are likely to be similar to UAP3 where unrestricted parking applies, see Table 1, Similarly effective parking restrictions can lead to higher flows.

		Two-way Single Carriageway- Busiest direction flow (Assumes a 60/40 directional split)									**Dual Carriageway**			
		Total number of Lanes									Number of Lanes in each direction			
		2				2-3	3	3-4	4	4+	2		3	4
Carriageway width		6.1m	6.75m	7.3m	9.0m	10.0m	12.3m	13.5m	14.6m	18.0m	6.75m	7.3m	11.0m	14.6m
Road type	**UM**	**Not applicable**										4000	5600	7200
	UAP1	1020	1320	1590	1860	2010	2550	2800	3050	3300	3350	3600	5200	*
	UAP2	1020	1260	1470	1550	1650	1700	1900	2100	2700	2950	3200	4800	*
	UAP3	900	1110	1300	1530	1620	*	*	*	*	2300	2600	3300	*
	UAP4	750	900	1140	1320	1410	*	*	*	*	*	*	*	*

Table 2 Capacities of Urban Roads
One-way hourly flows in each direction

Notes
1. Capacities are in vehicles per hour.
2. HGV ≤ 15%
3. (*) Capacities are excluded where the road width is not appropriate for the road type and where there are too few examples to give reliable figures.

WEST HORNDON, ESSEX

BRENTWOOD DISTRICT COUNCIL

NGR TQ 631 884

AN ARCHAEOLOGICAL DESK BASED ASSESSMENT

prepared on behalf of

COUNTRYSIDE PROPERTIES (UK) LTD

October 2014

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1 INTRODUCTION

a) Introduction

1.1 This report provides an Archaeological baseline appraisal document for a site known as Land East of West Horndon, Essex (centred NGR TQ 631 884). The Proposed Development Site (henceforth õthe Siteõ) comprises a relatively flat area of approximately **50 ha** in comprised by five fields either side of Station Road (Fig. 1). The railway (formerly known as the East Horndon Line) borders the south side of the Site, the A128 Tilbury Road borders the east side and West Horndon itself borders the southern section of the western boundary of the Site. Further farmland is found to the north and north-west.

1.2 The report has been prepared on behalf of Countryside Properties (UK) Ltd in support of a forthcoming Outline Planning Application for residential development at the Site. Brentwood Borough Council has identified the option for development in their Local Development Framework.

b) Scope of Statement

1.3 To compile the baseline assessment, the following actions have been undertaken;

- A search of the Essex Historic Environment Records database for all heritage assets (including archaeological sites, Listed Buildings, Conservation Areas, etc) recorded for a 1.5km radius of a central point within the Site (the Search Area);
- An examination of national and local planning policies in relation to heritage assets;
- A map regression exercise looking at the cartographic evidence for the Site;
- An assessment of available historical, archaeological, documentary and cartographic evidence (web based and other sources including a visit to the Essex Record Office at Chelmsford);
- An examination of aerial photographs held by the National Archive at Swindon;
- Consultation with the Historic Environment Management (HEM) team regarding the scope of this assessment and implications of the scheme; and
- Review of archaeological Research Agendas and Frameworks in relation to archaeological assets within and adjacent to the Search Area.
- A Site visit on 26th September 2014.

1.4 The Institute for Archaeologistsõ Standard and Guidance for Desk-Based Assessments (2011) sets a õstandardò for desk-based assessment as follows:

> **ñDesk-based assessment will determine, as far as is reasonably possible from existing records, the nature, extent and significance of the historic environment within a specified area.**
>
> **In a development context desk-based assessment will establish the impact of the proposed development on the significance of the**

historic environment (or will identify the need for further evaluation to do so), and will enable reasoned proposals and decisions to be made whether to mitigate, offset or accept without further intervention that impact." (IfA, 2011, 3-4)

1.5 The "Definition" of an assessment (IfA, 2011, 4) is given as:

"… a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets and, in England, the nature, extent and quality of the known or potential archaeological, historic, architectural and artistic interest. Significance is to be judged in a local, regional, national or international context as appropriate."

c) <u>Limitations</u>

1.6 In any desk-based assessment a degree of uncertainty is attached to the baseline data sources. This includes:

- The HER can be limited because it depends on random opportunities for research, fieldwork and discovery;
- Lack of dating evidence for sites;
- Documentary sources are rare before the medieval period, and many historic documents are inherently biased; and
- The extent of truncation caused by previous development impacts and landscaping works can not be fully ascertained.

2 LEGAL & POLICY FRAMEWORK

a) National Policy

i. Ancient Monuments and Archaeological Areas Act 1979

2.1 Chapter 46 describes the purposes of the Act as to make provision for the investigation, preservation and recording of matters of archaeological or historical interest and (in connection therewith) for the regulation of operations or activities affecting such matters.

2.2 Monuments deemed to be of such significance that they require this level of statutory protection are placed on the Schedule; i.e. they become designated as Scheduled Monuments. All Scheduled Monuments are of national significance.

2.3 The Act identifies a number of activities that are not permitted, predominantly those that would have the effect of demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding or covering up the monument. If work is proposed that would have any such effect on a designated monument, written consent is required from the Secretary of State. Class consents enable owners to proceed with certain specified works without an application for consent.

2.4 For the purposes of the Act the site of a Scheduled Monument includes not only the land on which it is situated but also any land comprising or adjoining it which appears to the Secretary of State or a local authority é to be essential for the monumentôs support and preservation. (61.9)

ii. Planning (Listed Buildings and Conservation Areas) Act 1990

2.5 Listed buildings and their settings are protected under the provisions of the Town and Country Planning Act 1971, as amended by the Planning (Listed Buildings and Conservation Areas) Act 1990. These empower the Secretary of State to maintain a list of built structures of national historic or of architectural significance. Listed buildings and their settings need not be preserved unchanged, but development should in all but exceptional cases, aim to preserve the buildingôs historic or architectural interest.

2.6 Conservation Areas (and their settings) are also protected under the provisions of the Town and Country Planning Act 1971 and the Planning (Listed Buildings and Conservation Areas) Act 1990. These impose on local authorities the duty to identify and protect areas worthy of preservation or enhancement. Again, development is not precluded, but it is the presumption that all development within the Conservation Area or its setting should aim to preserve or enhance the areaôs historic character or appearance. Local authorities are required to carry out appraisals of all of their Conservation Areas in order to define the areasôspecial characteristics/interest, to guide future development.

iii. The National Planning Policy Framework (Conserving and enhancing the historic environment)

2.7 The National Planning Policy Framework (NPPF) was published on the 27th of March 2012, and replaces the planning framework which consisted of Planning Policy Guidance and Statements (PPGs and PPS).

2.8 The NPPF (DCLG 2012) reflects previous planning guidance, and promotes sustainable economic development. As such the NPPF states that planning should operate to encourage and not act as an impediment to sustainable growth.

2.9 The NPPF (Section 12: Conserving and enhancing the historic environment) indicates that in determining applications local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting.

> **The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation. (**Paragraph 128)

2.10 In addition to the information that is required to be submitted with a planning application, NPPF indicates that Local Planning Authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise (Paragraph 129).

2.11 In determining planning applications, local planning authorities should take account of:

> - **"the desirability of sustaining and enhancing the significance of heritage assets;**
> - **the positive contribution that conservation of heritage assets can make to sustainable communities; and**
> - **the desirability of new development making a positive contribution to local character and distinctiveness."** (Paragraph 131)

2.12 NPPF also sets out that when considering the impact of a proposed development on the significance of a designated heritage asset, weight should be given to the asset's conservation. The more important the asset, the greater the weighting should be. The NPPF states that the significance of a heritage asset can be harmed or lost through alteration or destruction of the heritage asset or development within its setting and sets out that;

> **As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional."** (Paragraph 132)

2.13 The NPPF (Paragraph 135) also sets out that the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.

2.14 Paragraph 139 sets out that non-designated heritage assets of archaeological interest that are of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.

2.15 With regard to setting, the NPPF states (Paragraph 128) that local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assetsô importance and no more than is sufficient to understand the potential impact of the proposal on their significance.

2.16 Setting is described as:

> **"… the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral."** (DCLG, 2012 Annex 2: Glossary)

2.17 Significance is described as:

> **"The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting."** (DCLG, 2012 Annex 2: Glossary)

iv. Enterprise and Regulatory Reform Act 2013

2.18 The Enterprise and Regulatory Reform Act 2013 (ERRA) has made a number of changes to heritage legislation, including;

Listed Buildings

2.19 The ERRA has included an amendment to the Planning (Listed Buildings and Conservation Areas) Act 1990 that provides two potential ways to be more precise about what is listed.

2.20 The changes allow a definitive statement about whether attached or curtilage structures are protected by the listing definition and/or to exclude from listed building consent objects that are fixed to a listed building. It also allows a definitive statement that a part or feature of a listed building is not of special interest, for the purposes of listed building consent (http://www.english-heritage.org.uk/caring/listing/listed-buildings/listing-and-the-erra/?adnetwork=af)

Conservation Areas

2.21 The need to obtain Conservation Area Consent for the demolition of an unlisted building in a Conservation Area in England is removed.

2.22 Instead, such works will require planning permission. The need to obtain the consent of the local planning authority will therefore remain, but it will no longer be necessary to make two applications (one for planning permission and one for Conservation Area Consent) for a scheme involving the demolition and replacement of a building in a Conservation Area (Planning Portal, 2013). The Thorndon Park Conservation Area (Type ï Historic Park and Garden) lies immediately north of the Site.

b) <u>Regional and Local Planning Policy</u>

2.23 The land east of West Horndonôs site is identified on the Brentwood Borough Councilôs Local Development Framework. Information on the Council web-site indicates that the Brentwood Replacement Local Plan was formally adopted by the Council in 2005. Over the next two years a new Local Plan (2015 ï 2030) will supersede saved policies in the current Replacement Local Plan. The Replacement Local Plan contains the following policies:

2.24 Policy C9 ó Ancient Landscapes and Historic Parks and Gardensô relates to landscapes with particular Historic Environment significance. The policy reads:

> **THE COUNCIL WILL SEEK TO CONSERVE, ENHANCE AND MANAGE ANCIENT LANDSCAPES AND DESIGNATED PARKS AND GARDENS OF SPECIAL HISTORIC INTEREST. DEVELOPMENT WHICH WOULD DAMAGE THE CHARACTER OR APPEARANCE OF AN ANCIENT LANDSCAPE, OR OF A PARK OR GARDEN OF SPECIAL HISTORIC INTEREST OR ITS SETTING WILL NOT BE PERMITTED.**

2.25 Policy C14 ó Development Affecting Conservation Areas reads as follows:

> **WHEN CONSIDERING APPLICATIONS FOR DEVELOPMENT WITHIN AND IN THE VICINITY OF CONSERVATION AREAS, SPECIAL ATTENTION WILL BE GIVEN TO THE NEED TO PRESERVE OR ENHANCE THEIR CHARACTER OR APPEARANCE. DEVELOPMENT PROPOSALS WILL BE PERMITTED ONLY WHERE**
>
> **THE COUNCIL IS SATISFIED THAT:**
>
> **(i) THE PROPOSALS PRESERVE OR ENHANCE THE TOWNSCAPE CHARACTER OF THE AREA**
>
> **(ii) THE MATERIALS TO BE USED ARE SYMPATHETIC TO THE SURROUNDING BUILDINGS AND APPROPRIATE TO THE AREA**
>
> **(iii) THE MASS OF THE BUILDING IS IN SCALE AND HARMONY WITH THE ADJOINING BUILDINGS AND THE AREA AS A WHOLE**
>
> **(iv) THE DESIGN OF THE BUILDING IS SUCH THAT THE PROPORTIONS OF THE PARTS RELATE SATISFACTORILY TO EACH OTHER AND TO ADJOINING BUILDINGS**

(v) THE PROPOSAL DOES NOT AFFECT ANY BUILDINGS, OPEN SPACES, TREES, VIEWS OR OTHER ASPECTS WHICH CONTRIBUTE TO THE SPECIAL CHARACTER OF THE AREA

(vi) WHERE DEMOLITION IS PROPOSED, THE STRUCTURE TO BE DEMOLISHED MAKES NO MATERIAL CONTRIBUTION TO THE CHARACTER OR APPEARANCE OF THE AREA, AND THERE ARE SATISFACTORY PROPOSALS FOR THE RE-USE OF THE SITE INCLUDING ANY REPLACEMENT BUILDING OR OTHER STRUCTURE

(vii) WHERE A CHANGE OF USE IS PROPOSED, THE NEW USE WILL NOT REQUIRE ANY CHANGES IN THE APPEARANCE OR SETTING OF THE BUILDING OTHER THAN THOSE WHICH WILL PRESERVE OR ENHANCE ITS CONTRIBUTION TOWARDS THE CHARACTER OR APPEARANCE OF THE AREA

(viii) WHERE AN ALTERATION IS PROPOSED, IT IS APPROPRIATE AND SYMPATHETIC IN DESIGN, SCALE, MATERIALS AND COLOUR TO THE REST OF THE BUILDING.

OUTLINE PLANNING PERMISSION WILL NOT BE GIVEN FOR NEW BUILDINGS IN A CONSERVATION AREA.

2.26 There are no Listed Buildings that would be physically impacted by residential development of the Site. In terms of setting Policy C16 ôDevelopment within the Vicinity of a Listed Buildingô states:

PROPOSALS FOR DEVELOPMENT IN THE VICINITY OF A LISTED BUILDING WILL NOT BE PERMITTED WHERE THE PROPOSALS WOULD BE LIKELY TO DETRACT FROM ITS CHARACTER OR SETTING.

2.27 A single policy is provided in relation to Scheduled Monuments and known/currently unknown archaeological sites and features. Policy C18 ôAncient Monuments and Archaeological Sitesô states:

WHERE IMPORTANT ARCHAEOLOGICAL SITES AND MONUMENTS, WHETHER SCHEDULED OR NOT, AND THEIR SETTINGS ARE AFFECTED BY A PROPOSED DEVELOPMENT, THERE WILL BE A PRESUMPTION IN FAVOUR OF THEIR PRESERVATION IN SITU. IN SITUATIONS WHERE THERE ARE GROUNDS FOR BELIEVING THAT THE PROPOSED DEVELOPMENT WOULD AFFECT IMPORTANT ARCHAEOLOGICAL SITES AND MONUMENTS, DEVELOPERS WILL BE REQUIRED TO ARRANGE FOR AN ARCHAEOLOGICAL FIELD ASSESSMENT TO BE CARRIED OUT BEFORE THE APPLICATION CAN BE DETERMINED THUS ENABLING AN INFORMED AND REASONABLE PLANNING DECISION TO BE MADE. IN CIRCUMSTANCES WHERE PRESERVATION IS NOT POSSIBLE OR FEASIBLE, THEN DEVELOPMENT WILL NOT BE PERMITTED UNTIL SATISFACTORY PROVISION HAS BEEN MADE FOR A PROGRAMME OF ARCHAEOLOGICAL INVESTIGATION AND RECORDING PRIOR TO THE COMMENCEMENT OF THE DEVELOPMENT.

3 DEVELOPMENT PROPOSALS

3.1 The proposals are for a residential development of the c.50ha Site with associated infrastructure, community facilities and landscaping associated with growth of West Horndon village.

3.2 Formal master-planning is not yet available but Rummy Design (2013) have emphasised that a masterplan will be produced that contains a local character enhances certain topographical/cultural aspects of the landscape. The planned gateway to the Site would be via the A128 via its junction with Station Road. A ǿproposed masterplan conceptô (ibid) indicates states that:

> **'Our proposed masterplan concept...shows a clear landscape structure with the creation of a new gateway to West Horndon, centrally located public open space, wetlands and new residential blocks arranged in a rectangular layout. The concept plan provides for...**
>
> **61.26 Ha Land east of West Horndon**
>
> **37.26 Ha (61%) Land for open space, community facilities and infrastructure**
>
> **24 Ha (39%) proposed housing development areas**
>
> **This provide for up to 720 houses...'**

(NB 61.26ha noted relates to a previous red line incorporating land to the west and therefore these figures require adjustment)

3.3 The strategy draws upon a strong fenland character dominated by north-south woodland corridors (shaws) some of which follow natural drainage. In addition the report confirms the intention to minimise the visual impact on the immediately adjacent Conservation Area and Historic Park and Garden via new woodland planting along the northern edge of the Site.

4 BASELINE DATA

a) Site Description

4.1 The Site is at centred at NGR TQ631 884 directly to the east of West Horndon. The Site is bordered by the A128 to the west and the railway line to the south, whilst the A128 runs approximately east-west to the north. The wider setting includes Thorndon Country Park with urban centres at Upminster and Langdon Hill to the west and east respectively.

4.2 The Sit1 is situated over five fields of low grade arable separated by hedgerows and with the main access to West Horndon (Station Road) dividing the northern and southern areas.

b) Heritage Planning Background

Scheduled Monuments

4.3 Scheduled Monuments within the Study Area comprise the following conjoining medieval sites from c.0.8km to the north of the Site, immediately west of Thorndon Country Park South;

- ôFormer Parish Church and Churchyard of St Nicholasôï SM 1021225 (formerly 32471) (RPS 1 on Fig. 2); and
- (Former) ôOld Thorndon Hall and Gardensôï SM 1021226 (formerly 32473) ï (RPS 2).

Registered Park and Garden

4.4 Thorndon Hall Registered Park and Garden is located from the immediate north of the north-western area of the Site (RPS 10) and is Grade II* listed (Fig. 2).

Conservation Area

4.5 ôThorndon Park Conservation Areaô(RPS 11) was adopted in 1993 and is largely commensurate with the RP&G although it also includes open landscape to its west side (Fig. 2). The concurrent area is associated with woodland strips south of Mill Wood on both sides of the A127, Mill Wood, the Thorndon Country Park South and adjacent Old Hall and former Church of St NicholasôSMôs.

Listed Buildings

4.6 The closest Statutorily Grade I Listed Building within West Horndon Parish is:

- The Church of St Peter of the 15th & 16th century (and later) at Little Warley Lane c. 2.5 km to the west (beyond the HER Study Area)

4.7 Grade II* Listed Buildings within the Parish of West Horndon comprise;

- The Church of All Saints to the NW of the A127/A128 junction to the north-east (RPS 5); and
- Little Warley Hall ï 16th century+ hall and service unit of the former house ï c.2.5km to the west (beyond the HER Study Area).

4.8 There are six Grade II Listed buildings within the Parish of West Horndon. These comprise;

- Barnards (RPS 3) 18th century house c.170m south of the Site
- East Horndon Hall (RPS 4) ï 16th and 18th century+ brick clad timber framed house on NE side of A127/A128 junction to the north-east of the Site;
- Stabling at Church of All Saints (RPS 6) ï 17th century ï location as above
- Freman Monument in churchyard of All Saints (RPS 7) ï 18th century railed enclosure and x3 Portland stone monuments to the NW of the A127/A128 junction to the north-east of the Site;
- Dunton Hills (RPS 8) ï 17th century and later house and cottage 0.7km to the east of the Site; and
- Field House (RPS 9) a 16th century house situated 0.75km to the south-east.

c) <u>Topographic and Geological Background</u>

4.9 The underlying geology in the vicinity of the Site (BGS Sheet 257, 1996) is ôHead, undifferentiated: variable pebbly sandy clay of the Anglian to Flandrian above London Clayô The Mar Dyke Thames tributary runs c.1.6km to the south-west and west and one of its tributary streams runs north-south through the centre of the Site. This now minor stream is associated with a band of ôAlluvium: mainly sand, silt and clay with some gravelô Notably the character of the relatively flat landscape within the Site has more in common with the Fenlands around the Thames Estuary than the rising clay hillsides to the immediate north and east (Rummy Design 2013).

4.10 The landscape of the Site is gently sloping from *c.*10m above Ordnance Datum (aOD) in the central southern area up to c.16m-18m aOD in the north, with the gentle valley through the centre slightly lower than corresponding level to the east and west. The Head geology capped surrounding landscape to the west and south is generally similarly level and low-lying with the board alluvial flood plain of the Mar Dyke. The Site is located just south of an enclosing horseshoe of higher ground (including exposures of London Clay) shaped and scoured by a series of north-south valleys and rising to 65m aOD at Thorndon Country Park. The land also rises up to 40m aOD to the east at Dunston Hills and to c.0.6km to the north-west.

d) <u>Cartographic Background</u>

4.11 Map evidence obtained from a number of sources provides the following information regarding the Site.

Table 1: Cartographic Evidence

Map	Information
Walker Map of 1598	Shows the manor of Thorndon with the former Old Thorndon Hall in depicted in red to represent its red brick Elizabethan build. Manor as owned by 1st Lord Petre with the formal gardens and numerous outbuildings around the hall shown. Map does not extend south to the Site.
1773 map of Essex	No detail of field layouts but shows Thorndon Park Estate at its greatest extent (before Capability Brownôs landscaping) just to the north of the Site extending to East Horndon.
Survey of the Parish of East Horndon in the County of Essex, Henry Clayton ï 1845 (Tithe Map) (**Fig 3**)	As the parish boundary between East and West Horndon lies within the eastern portion of the Site rather than along the current road (as would be expected) both East and West Horndon Tithe Maps are relevant. The East Horndon map has only a slither of land within the east area of the Site with the notional (rather than physical) boundary cutting through open fields in the layout seen today. There are slight variances in field division. This includes the south-eastern field to the south of Station Road is subdivided into a northern and southern field via a curving east-west boundary whilst the currently straight boundary to the north-eastern field shows a kink. Ponds are shown in the south-east field and the southern area of the north-eastern field (adjacent to a kink in the southern boundary which is still present). In terms of adjacent farms and buildings a Barnards farm layout is depicted south of the south-east field (now south of railway), a windmill (no longer present) is shown on the east side of the road bordering the east side of the Site, and Horndon Hall is shown within its compounds to the north-east. There are no buildings within the Site.
Map of the parish of West Horndon in the County of Essex, 1863 (Tithe Map) (**Fig 4**)	The map shows the layout of fields in Qwest Horndon virtually unchanged from those of the present day (with the exception of the severing effect of the railway). The apportionment indicates multiple owners. The woodland fingers to the immediate north and north-east of the Site (ôBottom Shawôand ôStraight path Shawôare present (NB these currently form the east-and west sides of the southern extent of Thorndon Park Conservation Area). There are no buildings within the Site.
OS First Series 1:63360, 1856-1887	The Site is shown as landscape (no detail of fields). Most of the present lanes and roads (including Station Road and the A128 alignment) are present. ôE. Horndonôand ôThe Hallôlabelled to the NE. ôDunton Hallôto the NE, ôDunton Hill Farmôto the E, ôBernardsôto the south (beside the current A128) , Dunton hamlet to the south-east, Tillington Farm to the south-west and Little Warley to the west (and west of the river).
OS 1:10,560 1872 (surveyed 1865) First Edition (Fig **5**)	Shows Site before the railway with no major changes in field layout since the tithe map. The east-west aligned northern boundary (north-eastern fields) appears to show a bank or slope parallel with the field-boundary on the south side. ôBarnardsôfarm enclosures shown to the south of the south-east extent of the Site, ôEast Horndon Millsôwindmill enclosure to the east side and East ôHorndon Hallôto the north-east. Woodland shaws (fingers of north-south woodland) are depicted to the north and west, leading north towards Mill Wood and the remains of the ôOld Hallô(Thorndon Hall) and ôSt Nicholasôs Churchôto

Map	Information
	its west side. 'Old Hall Lane' is labelled as a north-south routeway running two fields to the west of the Site.
OS 1:2,500, 1896 Second Edition (Sheets LXXV.4, LXXVI.1. LXVIII.13 & LXVII.16.)	There is no 1st edition 1:.2500 scale map for West Horndon. The 2nd Edition shows the layout of fields at the Site as virtually unchanged. A dotted line labelled 'Und Boundary' runs north/south though currently open areas of the fields in the eastern area of the Site parallel with the road that borders the eastern side (now followed by the A128). Station Road is on its current course. Ponds were formerly located within the south-eastern field and north-eastern fields. There is no woodland within the Site with the current woodland areas of 'Round Shaw' and 'Straight Path Shaw' running approximately north-south to the west of the Site and 'Hollow Bottom Shaw' similarly aligned as a narrow band from just north of the central northern extent of the Site. The railway to the south is shown and labelled 'London Tilbury & Southend Railway' The rectilinear fields are numbered sequentially from 70 to 73 north of Station Road and 84 and 85 to the south.
OS 1:2,500, 1899	East Horndon Line opened in 1886 (south boundary of the Site). West Horndon station situated at intersection with St Mary's Lane/Station Road.
OS 1:10,560, 1921	No significant changes
OS 1:10,000, 1960	No significant changes within the Site although the residential development of West Horndon has now been completed to the immediate west.
OS 1:10,000, 1977-1991	No significant changes

e) Heritage Asset Background

4.12 The background is provided by recognised archaeological periods, as follows;

Prehistoric

- Palaeolithic — 500,000 to 10,000 BC
- Late Glacial/Mesolithic — 10,000 to 4,000 BC
- Neolithic/Early Bronze Age — 4,000 to 1,600 BC
- Middle to Late Bronze Age — 1,600 to 800 BC
- Iron Age/Roman Transition — 800 to AD 43

Historic

- Roman — AD 43 to 410
- Saxon — AD 410 to 1066
- Medieval — AD 1066 to mid-C16th
- Post-Medieval — circa AD 1550 to present

4.13 The archaeological background, as reflected in the 1.5km radius search of the Essex HER database (see Fig. 2 and Appendix 1 for the full search) provides evidence of human occupation and activity from the Neolithic/Bronze Age onwards (at present there is no evidence for Palaeolithic archaeological evidence in the vicinity, although Lower-Middle Palaeolithic handaxes are known from the Mar Dyke valley near Purfleet). Early settlement was almost certainly attracted to the area due to its advantageous topographical location on well drained and easily tilled gravel subsoil with higher ground suitable for upland pasture to the north.

Neolithic and Bronze Age

4.14 The Siteôs location within a horseshoe of low-lying landscape between c.10m and 17m OD to the south-east, south and south-west of higher ground rising to c.65m OD suggest the possibility of exploitation by prehistoric farmers for seasonally driven upland/lowland stock management systems. As such it is possible that livestock were grazed on the low ground in the drier months and moved upslope at other times. Stream corridors were also favoured by Mesolithic hunter-gatherers as route corridors and for the exploitation of fish, fowl and other resources.

4.15 A short stretch of UK Powerôs 4Basildon-West Horndon-Cranham power lineôc.1km to the south of the Site was subject to archaeological monitoring (RPS 47 on Fig. 2; Albion Archaeology 2012). A 0.45m deep and 1.48m wide ditch was identified. The feature contained a sherd of Late Bronze Age pottery and was sealed below a layer containing a further seven such sherds. The ditch probably formed part relate of a field-system on a north-north-west/south-south-east alignment (similar to the present landscape). The presence of pottery was taken to indicate the possibility of nearby settlement (*ibid*). The laying out of co-axial field-systems in low lying areas of southern England especially near major rivers and watercourses is a recurrent theme of Middle and Late Bronze Age period (Yates 2007). The phenomenon appears to reflect an intensification of agriculture associated with an increasingly hierarchical society concerned with parcelling the landscape into defined blocks (*ibid*). Although the evidence is slight the area occupied by the Site may have been defined as bounded farmland at this time.

4.16 A fieldwalking survey of 96 hectares of the Thorndon Country Park (RPS 27) collected a thin scatter of 62 pieces of worked flint of prehistoric date (45 flakes, 10 cores and 7 tools). The majority of pieces were concentrated at TQ 620895 and TQ 618900. In addition 10 sherds of prehistoric pottery (early Neolithic to late Bronze Age) were found by the survey at Jury Hill (RPS 28). Other findings of prehistoric date from the survey included a dense concentration of burnt flint to the immediate south of the Old Hall (RPS 29) which may have derived from a 'burnt moundô of possible Bronze Age date.

4.17 Two undated but potentially Bronze Age ring-ditches that are typical of burial mound (barrow) are located to the immediate south-west of the Site (RPS 25) and at the edge of the Study Area (RPS 26). The former is about around 15 metres in diameter. However, the National Mapping Project (NMP) has interpreted the feature as a pond (as shown on OS 1st edition 6' sheet 75 dated 1872). The latter comprises a possible dual concentric ring ditch approximately 10 metres in diameter that is visible on a 1995 aerial photograph. However, it is uncertain whether either or both are prehistoric in origin.

4.18 The geology mapping (BGS 1996) shows the Site containing alluvium within a slight north south stream valley of the Mar Dyke. Such valleys provide one possible route corridor for stock movement but also provide water for their management and potentially to support human

occupation in its vicinity. The Mar Dyke itself has produced Bronze Age implements including a leaf shaped sword and spearhead (Historic Landscape Management 2002). Alluvium is likely to be primarily of Neolithic and Bronze Age date. Elsewhere such deposits have been shown to contain peat levels with particular potential to contain well-preserved environmental remains and/or worked wood, in addition to artefacts (although presence of peat is not known for the present Site).

Iron Age

4.19 There are currently no Iron Age sites or finds recorded within the Study Area, although sites of the period elsewhere within the region suggest a well-populated landscape of dispersed farms and hamlets. For example an Iron Age (as well as Roman the Saxon) sites are known from Aveley closer to the Mar Dyke (Historic Landscape Management 2002).

Romano-British

4.20 Roman archaeological evidence from the Study Area in the form of artefacts and artefact scatters is likely to represent habitation areas. Most has come from the Thorndon Country Park but absence elsewhere may similarly reflect a paucity of fieldwork. A concentration of c.30 sherds of 1st to 2nd century Roman pottery was found by the fieldwalking at Jury Hill within Thorndon Country Park (RPS 30). Another concentration of c,.45 Roman sherds, this time of late 2nd to mid 3rd century date was found to the north-west near Childerditch Brook (RPS 32). This is likely to relate to below ground archaeological remains. Also within the Park to the north of the Site is single Roman brooch find (RPS 36) whilst fragments of Roman brick (along with burnt flint of prehistoric date) were recovered from Park works associated with the halfway House to Herongate Reservoir Triplication Scheme (RPS 37-40).

Anglo-Saxon & Medieval

4.21 Both East and West Horndon were within the administrative Hundred of Barstable. The north-south linear parish of West Horndon was divided between three manors in the medieval period with Tillingham Hall manor the largest.

4.22 Prior to conquest in the reign of Edward the Confessor the estate was held by two feemen (one possibly Edmund, son of Algot - http://www.thorndonhall.co.uk/thorndon-hall-history.htm). At conquest the manor was held by a freewoman, Alwin, but by the Domesday Book compilation of 1086 had been granted to Swain (or Suain) a sheriff of Essex in 1075, with the Tillingham family in possession of the hall for several centuries after.

4.23 Although there is currently no Victoria County History coverage for East and West Horndon the 'History of Thorndon Hall' *(ibid)* and Everson (2001, 49-52) provide a historical framework. The original village of Thorndon i.e. East Horndon (known as Torinduna in 1086 – note slightly differently spelling to that of Torninduna = West Horndon) was built around the hill to the north-east of the Site where All Saints (RPS 5, 20 &21) stands. The current 15th century church is at least the third built there following buildings founded around AD807 and a Norman style building by the Neville family at c.1200 (Wikipedia). In 1185 the manor was under the ownership of Henry de Cornhill at which time it was known as Torindone. By 1228 it was known as Esthornedon. For a time it was under the ownership of the Abbot of Waltham and was known as the manor of Thorndon Magna under John de Breazun in 1275. Later in the early 15th century the name changed to 'Great Horndon' and by the early 16th century and in 1593 as Thornedon Magna

(Everson 2001, 52). Hordon was preferred to Thorndon by 1800 when the current 'East Horndon' was coined.

4.24 According to Wikipedia the manor was owned by Sir William Bawd, who conveyed it to Coggeshall Abbey and it remained under its control until the Dissolution. Under control of the Abbey the rights to commons appear to have been may have been restricted as there are records from manor-courts rolls of people being prosecuted for trespass on land belonging to the lords (http://en.wikipedia.orgwiki/West_Horndon). These former commons were then left as woodland and wild heath for hunting, and probably correspond to equivalent landuse areas today (*ibid*) and therefore probably not commensurate with the Site.

4.25 The majority of the Site lies within West Horndon parish whose main manor was known as Torninduna with name changes including Tornindone in the early 13th century and Thorndun and then Thorendon later in the century. By 1317 it was known as West Thornedon and by 1432 as Westthornedon (Everson 2001, 52). The Domesday Book records that Torininduna was assessed as five hides and 15 acres (*ibid*). The manor later became the seat of the Thorndon Estate of the Lords of Petre (below).

4.26 The buried remains of the Scheduled Monument of Old Thorndon Hall (RPS 2, 12 & 13) on the ridge to the north of the Site date from 1414 with the Manor House finally demolished in 1763. According to the HER 1957-1959 excavations in the woodland area of the site have confirmed three main periods of construction comprising massive brickwork with outer bastions and buttresses forming a central rectangular block in 1414, the addition of a west wing c.1450 and a post-medieval phase (the Walker map of 1598 shows Old Thorndon Hall after 16th century remodelling). Construction materials associated with the gatehouse and stables have been found in the fields south of Old Hall Wood and foundation alignments were confirmed by geophysical survey in 1997. In particular the perimeter wall of Old Thorndon Hall with associated gatehouse, which appears to comprise of three circular structures, were identified. The site was Scheduled in 2004.

4.27 Conjoining Thorndon Hall SM on its south side (south of the modern hedge line) is the site of the medieval church of St Nicholas (RPS 1, 14 & 15). The SM includes the churchyard area with its cemetery foundations and internal human remains and archaeological remains of the church itself. Other medieval finds from the area include sherds of pottery found by the fieldwalking at the top of Jury Hill within Thorndon Country Park (RPS 31) and to the east of Childerditch Brook (RPS 33).

4.28 The issue of why the boundary between the parishes runs through the centre of fields of the Site's landscape, and not along the road line now followed by the A128, is of clear interest. According to Everson (*ibid*) the ancient route from Brentwood to the Thames that marked the division between the medieval manors of Torinduna and Torninduna was followed by the present road alignment, for the most part, apart from within Herongate hamlet where both sides of the road fall within East Horndon. The reasons for this are unclear. Herongate and Ingram were the other two hamlets along with East and West Horndon that are considered to have functioned as a dispersed village (*ibid*).

4.29 The landscape of Essex is characterised by dispersed moated sites representing the elaborated homesteads of rural landowners. Extant remains of moated sites are located between Friern Manor and Dunton Hall to the east, whilst Little Warley Hall is located c.2.5km to the west. A third

moated site is located adjacent to Little Tillington Hall Farm (RPS 18) c.1km to the south-west of the Site. Although the hall itself (RPS 19) comprises an 18th century timber-framed brick clad house its earlier incarnation was no doubt within the platform still partially demarked by the remnants of the medieval moat. A possible moated site is also recorded within Thorndon Country Park to the north of the Site (RPS 41). The spacing of these moated sites and in relation to Thorndon Hall supports a conclusion that the Site area was within manorial ownership as working farmland. However, it remains possible that lower status occupation sites (for example of estate workers), or other sites dating to before the High Medieval heyday of the moated sites, could be present within the Site.

Post-Medieval

4.30 The post-medieval development of the Site itself is largely traced by the historic mapping (above). As noted above the Walker Map of 1598 provides detailed information on the layout of the post-medieval Manor House of Thorndon as owned by the 1st Lord Petre. The map shows the red brick Elizabethan building within its walled compound and associated with outbuildings. The Scheduled Monument area (RPS 2) reflects the 1598 layout with Old Hall Pond still extant to the east side. The information board at the SM provides information on the extant earthwork mound (RPS 17) known as ôthe Pigeon Mountô within the SM as a 1600ôs base for a former octagonal tower affording those within of views over the Thames Estuary. The former structure appears to have functioned as both a summer house and dovecot. By 1713-1742 the 6th Lord Petre had planned very elaborate gardens although it is not clear whether these were built out. Nevertheless he is credited with early attempts at growing exotic fruit within hothouses creating a menagerie with exotic animals including elks.

4.31 His Octagon Plantation of 1733 (RPS 23) enabled the early growth of 20,000 American trees for planting on the estate. The HER records that this embanked enclosure was c.150m with an extant ditch that skirts the outside of c.1m high surviving bank (in places) to the north side. Excavations in 1992 consisted of six small machine trenches but no sign of the internal but no trace of (the designer Bourghtonôs) internal design other than paths was found.

4.32 The 9th Lord Petre built the new mansion to the north of the original site in 1770 in the Georgian style. This phase necessitated the demolition of the Elizabethan version that would have overlooked the Site (the remains of the red brick foundations are located within ôRuin Woodô within the SM). As noted in the map regression the 1773 map of Essex shows the full extent of the Thorndon Park Estate extending just north of the Site.

4.33 A large quantity of post-medieval pottery and brick has been found east and west of the Old Hall at Thorndon Country Park (RPS 34) whilst post-mediaval tile has been recovered from the area of St NicholasôChurch (RPS 35). A possible watermill site on Walkers map of 1598 (RPS 43) is also recorded on the HER within the park area.

4.34 In terms of agriculture within the wider landscape Mill Wood to the north of the A127 relates to the former location of a mill, whilst a windmill is shown on the 1845 East Horndon Tithe Map to the east of the Site (Fig. 3). The landscape is divided by a series of straight north-south lanes leading towards the Thames Estuary, although the curvilinear Station Lane may be earlier in origin.

4.35 In 1870-72, John Marius Wilson's Imperial Gazetteer of England and Wales described West Horndon as:

> **'HORNDON (WEST), or WEST THORNDON, a parish in Billericay district, Essex; 2 miles SE of Brentwood r. station. Post town, Brentwood. Acres, 470. Real property, £653. Pop., 94. Houses, 12. Thorndon Park here, was formerly the seat of the Fitzwalters; is now the seat of Lord Petre; and has some good portraits and a Roman Catholic chapel. The living is a rectory, united with the rectory of Ingrave, in the diocese of Rochester. Value, £347.* Patrons, Representatives of the late Rev. R. A. Johnston. The church is a brick edifice of 1734, with a tower; and has a brass of 1400.'**

(after A Vision of Britain Through Time online; http://www.visionofbritain.org.uk/place/6805)

4.36 The 'East Horndon' railway otherwise known as the 'London Tilbury & Southend Railway' was built in 1886. In 1930 farm workers occupied three houses commensurate with the 1950's development of Thorndon Avenue to the west of the Site, one of which survives (Number 18 which has been restored to its original condition). The rest of Thorndon Avenue was constructed during the 1950's. It should be noted that although the Site lies within Brentwood District the southern area of the parish of West Horndon now lies in the unitary authority of Thurrock.

4.37 In terms of other post-medieval archaeology an area of burnt clay associated with a thick glass wine bottle, post-medieval pottery and tile was found within the A127 road cutting (RPS 22). In addition two rectangular enclosures as crop-marks at Fieldhouse some 1.75km to the south of the Site (RPS 25) were investigated in 2011 (Albion Archaeology 2012). These were found to be post-medieval/modern in date.

4.38 Finally a large area to the north-west of the Site within Thorndon Park was used in WWII as a camp (RPS 45). The camp extent can be seen on aerial photographs and by March 1944 around 50 huts were visible before removal by October 1946. The facilities included a practice zig-zag trench along with a bombing range, firing range, D-Day marshalling area and prisoner of war camp.

4.39 **Undated**: As noted above two other aerial photographic sites are recorded and plotted on the HER, These comprise a ring-ditch just to the south-west of the Site (RPS 24) and a 'bomb crater, rectangular enclosure and the small double ring-ditch further to the south-west still (RPS 26).

f) <u>Additional information</u>

4.40 Research Aims for archaeological fieldwork in the Eastern Counties of England have been set out (Brown & Glazebrook, eds, 2000) following on from an earlier Resource Assessment (Glazebrook 1997). These documents have been updated more recently by 'Research and Archaeology Revisited: a revised framework for the East of England' (EAA Occ. Paper No 24, 2011).

4.41 The Essex Thames Gateway Historic Environment Characterisation (ECC 2007) provides a further tool in the assessment of the Historic Environment of the Site. The report was designed 'to serve as a tool for the management and enhancement of the historic environment.' And in particular to;

- Provide the opportunity to safeguard and enhance the historic environment as an integrated part of development within Thames Gateway

- Provide Guidance to Planners at the early stages of development proposals &
- Provide a means for local communities to engage with their historic environment.

4.42 The project involved creation of a number of Historic Environment Character Zonesôwithin wider Character Areas. The characterisation was informed using a range of criteria:

- Diversity of historic environment assets
- Survival
- Documentation
- Group Value Association
- Potential
- Sensitivity to change, &
- Amenity Value

4.43 Each is scored from 1 to 3 for the identified zones with 1 lowest and 3 highest. The Site lies immediately south of the two Historic Environment Character Areas (HECAôs). The boundary between the two is meets the railway just to the south. The report contains the following characterisation for eastern zone HECA Zone 112_1 ôBulphan and Orsett Fenôand western zone HECA 112_2 ôLand between Bulphan and Langdon Hillsô

> **ñHECA Zone 112_1 Bulphan and Orsett Fen**
>
> **Summary: This is a predominantly rural zone, which retains some of its historic features. The field system of small, rectilinear enclosures probably relates to the early enclosure of former fenland. The zone includes the upper reaches of the Mar Dyke Basin which has palaeo-environmental potential.**
>
> **Geology: The underlying bedrock of the zone consists mostly of London Clay Mudstone bordered at the south by band of Harwich Formation Sand and Gravel and then Lambeth Group Sandstone and Mudstone. These are overlain by Boyn Hill Gravel at the west, colluvial head deposits across the zone and alluvium in the Mar Dyke Basin.**
>
> **Historic Landscape Character: This zone includes the medieval village of Bulphan, and contains a number of medieval moated sites indicative of the dispersed settlement pattern. Much of the area is a low-lying basin rising steadily to the east, which is intensively farmed and strongly rural in character. The fields are generally regular in shape, with long slightly sinuous boundaries running down from high ground to the north, possibly reflecting the enclosure of fenland common. In the low lying areas they are bounded by drains. Distinctive hawthorn/elm hedgerows follow wide, verged historic lanes and tracks across the area. The area contains a scattering of smaller ponds along with some small reservoirs.**

Archaeological Character: The zone includes the Mar Dyke Basin, characterised by Holocene alluvial clays and silts, with high potential for palaeo-environmental deposits. Its archaeological character is also derived from small concentrations of archaeological deposits and sites, including an excavated Iron Age/Romano-British farmstead in the southern tip of the zone, and evidence of medieval settlement. The zone, therefore, has archaeological potential relating to a long history of occupation, and it is possible that significant archaeological sites may lie undisturbed within the 'bowl-like' landscape.

HECA Zone 112_2 Land between Bulphan and Langdon Hills

Summary: The area comprises the eastern part of Bulphan Fen and the slopes rising to higher ground at Dunton, Langdon and Horndon. This is a predominantly rural zone, which retains much of its historic landscape. The dispersed settlement pattern in the area has a long history of occupation, and the field system of rectilinear enclosures is of ancient origin.

Geology: The underlying bedrock of the zone consists of London Clay Mudstone, which is overlain by colluvial head deposits and alluvium.

Historic Landscape Character: This zone contains a number of medieval moated sites, as well as timber-framed farmhouses and barns of 15th-18th century date, that demonstrate the survival of a dispersed settlement pattern. It has retained its historic field system of rectilinear enclosures, although suffering some boundary loss. It is intensively farmed and strongly rural in character. Distinctive hawthorn/elm hedgerows follow wide verged historic lanes and tracks across the area. The area contains a scattering of smaller ponds and some small reservoirs.

Archaeological Character: The clay land is unconducive to cropmark formation and there has been little development led excavation. However, localised concentrations of archaeological deposits and sites indicate prehistoric, Romano-British and medieval settlement activity in this zone. These indicate the long history of occupation and landuse, and the potential for undisturbed archaeological sites within the landscape. The built environment, consisting of various historic timber structures form an important part of the historic character, as well as a WWI and WWII airfield."

4.44 The associated scoring is tabulated area follows:

Table 2: HECA 112_1 (After Essex CC 2007)

Diversity of Historic Environment Assets	Diverse historic rural environment	2
Survival	Good survival of archaeological and palaeo-environment deposits in all areas	3
Documentation	HER date, historic mapping, NMP	3
Group Value Association	Historic landscape of fields village and farms	3
Archaeological Potential	High potential for surviving archaeological and palaeo-environment deposits	3
Sensitivity to change	Historic rural and landscape and potential below ground archaeological deposits are sensitive to change.	3
Amenity Value	Potential to use the surviving elements of the historic landscape and settlement pattern together with archaeological evidence to enhance appreciation of the historic development of the zone.	3

Table 3: HECA 112_2 (After Essex CC 2007)

Diversity of historic environment assets	Multi period settlement pattern.	2
Survival	Good survival of archaeological and palaeo-environment deposits. Historic landscape survives well.	3
Documentation	HER data, historic mapping.	2
Group Value Association	Historic field and settlement pattern	3
Archaeological Potential	Good potential for discovering archaeological and palaeo-environment deposits	3
Sensitivity to Change	Rural landscape is highly sensitive to development and change	3

Amenity Value	Potential to use the surviving elements of the historic landscape and settlement pattern together with archaeological evidence to enhance appreciation of the historic development of the zone	3

4.45 The adjacent Character Areas are therefore extremely similar to one another. The scoring for ó*Diversity of historic environment assets suggests the areas contain a range of assets of different date and character*ô (*ibid*) and in particular a multi-period settlement pattern (HLCA 112_2). In terms of ó*Survival*ôthe document suggests there is a evidential basis for concluding that there is known and potential archaeological survival across the zones, in part due to a low level of disturbance in the area from development or quarrying, allowing the conclusion that the ó*Zone contains known assets which are well preserved*ô In particular both areas contain good potential for palaeo-environmental remains, whilst both archaeology and historic landscape are highlighted for 112_2. For ó*Documentation*ô (results of archaeological fieldwork, NMP, historical documents etc) HLCA 112_2 suggests that that ó*a range of documents...*ôexist whilst for HLCA 112_1 ó*a wide range of documentation*ôis available reflecting variations in the evidence base to the south of the Site. In terms of ó*Group value*ôboth contain aspects of historic landscapes of fields villages and farms that can be seen as integrated elements of landscape management and exploitation. These are given the highest group value (i.e. ó*contains a range of historic assets which are related such as moats with well preserved field systems...*ô).

4.46 Archaeological ó*Potential*ô as defined in the report is also at level 3 with an emphasis on a high potential for both archaeological and a plaeo-environmental remains. The latter associated with the Mar Dyke, its flood plain and tributaries (which include the watercourses present at the Site). In level 3 for Potential the basis is that ó*current evidence and little disturbance indicates that a range of high quality assets probably survive within the zone*ô However, a high potential will not always correlate with an actual presence of high quality archaeology at any one site (including the present Site).

4.47 ó*Sensitivity to Change*ôaspects for the two zones are slightly different within the document with below ground archaeological deposits cited as sensitive to change in 112_1 and historic rural landscape as sensitive to change in both. Both areas are scored at 3, defined as ó*the zones historic environment is highly sensitive to medium to large scale development*.ôHowever in the case of the Site the distance from the known medieval sites reduces the sensitivity to change, whilst there has been loss of field-boundaries and these may in any case be of Inclosure rather than medieval date. Finally Amenity Value is at 3 for both which is an acknowledgement that there is good potential for explanation and interpretation of historic remains (i.e. ó*The historic environment plays or could play a key role in the zones sense of place for the local people and visitors*ô). Contains assets which are, or could be promoted for the benefit of local people or visitors.ôThis noted there are currently no such sites known within the present Site and these issues apply more widely to the zone to the south. They are equally, if not more apt for the Old Thorndon Hall and gardens Scheduled Monument site to the north, where there are initiatives to enhance its profile (see SM description).

g) Aerial Photographs

4.48 The HER includes aerial photographic information which has been cited above and is shown graphically on Fig.2. An addition search of aerial photographs held by the English Heritage Archive was made by RPS for the assessment of this Site. This comprised 80 verticals between 1944 and 1995 and 9 oblique shots between 1948 and 1995. A list of the sorties examined is provided as Appendix 2.

4.49 The earliest vertical and oblique photographs examined date to the 1940ôs. RAF oblique photographs of the area of Barnards Farm to the south of the Site and railway taken on 28th September 1948 show two circular features (east of RPS 24) that appear fresh and of modern in derivation. However they seem to confirm that the ring-ditch at RPS 24 is a pond (water is observable on a number of frames (e.g. RAF_540_109_PFF0_102). The 1940ôs shot shows the A127 extant but of course the new alignment of the A128 is yet to be constructed and Tilbury Road is a straight thoroughfare. The Siteôs fields appear to have been under cultivation throughout. They chart the residential development of West Horndon with the southern east-west aligned area in existence, although incomplete, by 1946 and the complete development including the north extension of the village by 1961.

4.50 A diagonal route from the SE corner of the Site aligned NW is not shown on the 1940ôs frames but appears as an active straight dirt track by 1955. Subsequently and up to the latest sorties the modern alignment is shown as a dark linear suggesting an effect on soil compaction when returned to agriculture.

h) Consultation

4.51 RPS has discussed the scope of this document and the archaeological background to the site with the LPAôs Archaeology Officer at Essex County Council HEM team on 25th September 2014. The HEM team recommended the above reference to the HLCAôs.

4.52 English Heritage will be consulted in due course due to the proximity of the Historic Park and Garden and with regard to the visual setting of the Scheduled Monuments to the north. The Brentwood Conservation Officer will be consulted with regard to the adjacent conservation Area and visual aspects in relation to Listed Buildings.

i) Site Walkover

4.53 A site walkover survey was conducted on 26th September 2014. The weather conditions were overcast but visibility was good. The walkover commenced at the west end of Station Road. All of the fields to the south side were ploughed and harrowed with no earthworks visible. The land slopes down from the railway to Station Road in the south-eastern field. A high hedge borders the north side of Station Road and although of diverse species composition including hawthorn, maple, hazel and blackthorn it lacks mature trees (particularly oaks) of a mature boundary and probably not an ancient hedge (although this does not preclude the road itself from being ancient). Views were also observed of the fields to the north of Station Road from the road-side. The eastern field was similarly ploughed and harrowed with no visible earthworks, whilst the two fields adjacent (the larger eastern field bordering the A128) were fallow and presently under grass. A small stream/ditch runs north/south between the arable and fallow fields. The stream line also forms the boundary between the eastern and western fields to the south of Station Road

where it is bordered by an immature and broken hedge line. There are distant views of Thorndon Country Park and the SM area and of All Saints Church from breaks in the hedge, looking north and north-east respectively.

4.54 The walkover route then followed the A128 north past Dunton Hills Farm to the east of the Site. The hedgerow bordering the A128 and Tilbury Road (that borders the north-eastern edge of the Site) is high but of recent planting (fast grown maple and hawthorn species with low species diversity) and offers good screening. The hedge bordering the northern side of the pasture (fallow) field north of Station Road has an S-curve, although it is not clear whether the curve was due to a meander in a concurrent minor stream at the boundary, or indicative of a medieval, rather than Inclosure period origin. However, the hedge is noticeably more mature than the roadside hedges and field hedges described elsewhere within the Site. The north-eastern field of the Site was also currently under scrub pasture, having previously been used as arable (plough lines still visible beneath grass). The wide hedge bordering the northern edge of the field comprised of blackthorn/hawthorn. This may reflects a later age for this straight east-west boundary in comparison to the parallel S-curve boundary to the south. Following the road north past East Horndon Hall it was noticeable that this Listed Building was well screened from the Site by high hedgerows of Tilbury Road.

4.55 The walkover then followed the A127 past Woodside Farm (a stud farm with surrounding paddocks). The footpath was then taken south to the west side of a finger of woodland known as 'Straight Path Shaw' on the 19th century mapping. The woodland finger lies to the north-west side of the western arable field of the Site but is of interest as it borders the main stream through the area which flows south towards to the west of the Site. A 0.8m high linear bank within the woodland, between the stream and the field edge, probably marks one side of a former c.15m wide drove route following the stream course. The longevity of the woodland, which continues as 'Round Shaw' to the south, as shown by historic mapping, suggests at least a post-medieval derivation to the course. The north-west field of the Site was visible from the footpath as being ploughed and harrowed and was bordered on all sides by relatively immature hedgerows typical of Inclosure landscape. The playing field to the west of the field was accessed and views onto the field confirm that there are no prominent earthworks within the field (as would be expected of a frequently ploughed landscape).

4.56 It is also worth noting that the tithe and OS mapping shows that the former boundary between East Horndon and West Horndon ran north-south to the west side of the modern A128/Tilbury Road and that routes former incarnations. In terms of the modern field layout there is no sign of this boundary, although it is likely that it had originally been laid out to respect a boundary of some kind (route or field boundary). In particular there were no earthworks (e.g. a linear depression) visible from the public access viewpoints running to the west of the present road.

4.57 Views to/from the Site were considered. As noted All Saints Church to the north-east is visible from the Site due to its elevated location. However, when standing beside the church views of the Site are obscured by an enclosing hedge. The brick built church is not currently in use but is cared for by the Churches Conservation Trust. Although not in regular use it remains consecrated. The tower windows are boarded over.

4.58 Similarly the Site is inter-visible with the Scheduled Monument of Thorndon Hall on the high ground to the north. Although there are areas of the Site screened by vegetation the southern and central fields of the Site are visible from the higher areas within the SM. There are very few

remaining traces of the hall itself above ground within the pasture areas of the SM, apart from the two tier circular earthwork mound known as the 'Pigeon Mount'. There are ruins within the woodland area to the south side of the SM which do not have inter-visibility with the Site. The views from the SM will need to be assessed in more detail and the potential impacts and means of mitigating visual impacts will need to be developed in consultation with English Heritage in terms of development for design and screening.

j) <u>Truncation</u>

4.59 Map regression indicates that the Site has been located within fields since at least the 19th century and given the landscape setting were probably under the plough from at least the medieval period. Aerial photographs confirm that the Site has been under the plough since at least the 1940's. Modern deep ploughing will have truncated upper levels of any archaeological features within the Site and may have entirely or partially removed associated occupation layers. However cut features such as ditches, pits, post-holes and foundations may survive as other forms of truncation, such as quarrying, appear absent within this rural landscape.

5 ASSESSMENT CRITERIA/METHODOLOGY

5.1 The following approaches to assessing significance, impact and effect in relation to archaeology have been utilised.

a) Significance

5.2 Significance is described in NPPF (Annex 2) as:

> **"The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting."**

5.3 There are no national government guidelines for evaluating the significance of all types of heritage asset. For archaeological remains, DCMS has adopted a series of recommended (i.e. non-statutory) criteria for use in the determination of national importance when scheduling ancient monuments. These are expressed in DCMS (2013).

5.4 The criteria include period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity and potential, and can be used as a basis for the assessment of the importance of historic remains and archaeological sites. However the document also states that these criteria ósshould not be regarded as definitive; but as indicators which contribute to a wider judgment based on the individual circumstances of a case.ô

5.5 These criteria can be used as a basis for the assessment of the importance of archaeological remains/heritage assets of national importance. However the categories of regional and district / local importance are less clearly established than that of national importance, and implicitly relate to local, district and regional priorities which themselves will be varied within and between regions.

5.6 Clearly a degree of professional judgement is necessary, guided by acknowledged standards, designations and priorities. It is also important to understand that buried archaeological remains may not be well-understood at the time of assessment, and can therefore be of uncertain importance.

5.7 The following table assists in assessing the significance of archaeological assets.

Significance	Type of Asset
Very High	▪ World Heritage Sites ▪ Assets of acknowledged international importance ▪ Assets that can contribute significantly to acknowledged international research objectives
High	▪ Scheduled Monuments ▪ Undesignated assets of schedulable quality and importance ▪ Assets that can contribute significantly to acknowledged national research objectives
Medium	▪ Designated or undesignated assets that contribute to regional research objectives
Low	▪ Undesignated assets of local importance

Significance	Type of Asset
	▪ Assets compromised by poor preservation and/or poor survival of contextual associations ▪ Assets of limited importance, but with potential to contribute to local research objectives
Negligible	▪ Assets with very little or no surviving archaeological interest
Unknown	▪ The importance of the asset cannot be ascertained

b) Impact

5.8 Impact scales to all heritage assets are defined as follows:

- **Major:** Change to most or all key elements, such that the asset is totally altered and much of its significance is lost. Substantial change within the setting leading to alteration of significance of the asset.
- **Moderate:** Changes to many key elements, such that the asset is clearly modified and there is some loss of significance. Change within the setting leading to some loss of significance of the asset.
- **Minor:** Changes to key elements, such that the asset is slightly altered and there is a slight loss of significance. Slight change within the setting leading to a slight loss of significance of the asset.
- **Negligible**: Very minor changes to key elements or within the setting that hardly affect the significance.
- **No change:** No change to key elements or within the setting.

c) Effects

5.9 Effects are calculated through a matrix approach which combines the importance of the heritage asset with the magnitude of impact on that asset to provide an overall assessment of effect. Effects can be adverse or beneficial.

5.10 Beneficial effects are those that mitigate existing impacts and help to restore or enhance the significance of heritage assets, therefore allowing for greater understanding and appreciation. The following matrix approach is used.

Significance	Effect	Effect	Effect	Effect	Effect
Very High	Neutral	Minor	Moderate	Major	Major
High	Neutral	Minor	Moderate	Moderate	Major
Medium	Neutral	Minor	Minor	Moderate	Moderate
Low	Neutral	Minor	Minor	Minor	Minor
Negligible	Neutral	Neutral	Neutral	Neutral	Minor
	No Change	**Negligible**	**Minor**	**Moderate**	**Major**
	MAGNITUDE OF IMPACT				

6 LIKELY DEVELOPMENT EFFECT (ARCHAEOLOGY)

a) Introduction

6.1 This assessment of effect uses the Assessment Criteria/Methodology set out above. At present the information available is preliminary and a more detailed assessment would be required in the event of a full EIA process. Such a process would require detailed assessment with regard to setting (which has additional criteria not applicable to this stage of the process due to the preliminary status of the design concept) and mitigation. This section provides an initial assessment of likely levels of effect on (currently unknown) archaeology prior to the results of (likely requirements for) evaluation fieldwork. Aspects of remaining Historic Environment categories that would require visual impact assessment impact in due course are noted.

b) Significance

6.2 Significance (and potential) varies by the archaeological periods discussed.

i. Prehistoric

6.3 The Siteôs location on low-lying landscape to the east, south and west of a crescent of hills suggest the possibility of exploitation by prehistoric farmers for seasonally driven upland/lowland stock management systems. As such it is possible that livestock were grazed on the low ground in the drier months and moved upslope at other times. Archaeological fieldwork has been mainly concentrated on the Thorndon Country Park area to the north where fieldwalking located several spreads of worked flint, burnt flint and pottery (mainly of Neolithic to Bronze Age date). A pipeline trench to the south-west has indentified a probable field-system ditch of later Bronze Age date. However, the dating of two possible ôring-ditchôfeatures on aerial photographs also to the south-west of the Site as prehistoric is far from certain (one appears to have been a pond on aerial photos). Given the above there is moderate potential for the presence of currently unknown prehistoric archaeology within the Site. If present such archaeology is most likely to be related to former field-systems, although the possible presence of settlement/s or funerary remains cannot be discounted given the size of the Site.

6.4 Fragments of prehistoric field-systems may be regarded as being of low (local) significance, whilst well-preserved and extensive archaeological landscapes are regarded as being of medium (regional) significance. Similarly surface prehistoric scatters of artefacts may be regarded as of low significance, whilst buried archaeological remains of prehistoric sites (settlements, funerary remains, industry etc) are most commonly of low to medium significance (depending on the preservation, form and rarity). There is currently no evidence for prehistoric archaeology of high significance within the wider area of the Study Area.

6.5 The geology mapping (BGS 1996) shows the Site containing alluvium within a slight north south stream valley. Such valleys provide one possible route corridor for stock movement but also provide water for their management and potentially to support human occupation in its vicinity. Alluvium is likely to be primarily of Neolithic and Bronze Age date. Elsewhere such deposits have been shown to contain peat levels with particular potential to contain well-preserved environmental remains and/or worked wood, in addition to artefacts (although presence of peat is not known for the present Site).

6.6 Fragmentary basal remains of alluvium (of low to medium significance) might be impacted by infrastructure and/or foundations.

ii. Roman

6.7 In a similar fashion to the prehistoric periods there are hints at settlements from wider Study Area (pottery and tile scatters from Thorndon Country Park) but no current evidence from the Site itself. It is considered very likely that the Site area was farmed in the period and therefore evidence for field-systems (in the form of ditches) and associated features (such as trackways and waterholes) are considered quite likely to be present, at least in fragmentary form. There is low-medium potential for the Roman-British settlement within the Site, although it is probable the higher ground beyond the Site was favoured. Again fragmentary fieldsystem evidence would be considered to be of low significance, whilst well-preserved 'readable' landscapes might be of low-medium significance. Similarly surface scatters of Romano-British artefacts may be regarded as of low significance, whilst buried archaeological remains of prehistoric sites (settlements, funerary remains, industry etc) are most commonly of low to medium significance (depending on the preservation, form and rarity). There is no reason to suppose the presence of highly significant Roman period remains on the Site. There is also a low possibility of Roman period alluvium deposits containing structural evidence and/or artefacts of low-medium significance.

iii. Early Medieval (Anglo-Saxon) and High Medieval

6.8 Elements of the framework of the modern landscape, comprising a series of north-south boundaries and routeways and to an unknown (but almost certainly lower) extent, the patchwork of field-boundaries between, are likely to originate in the medieval period. The landscape form is perpendicular to the Thorndon Country Park ridge but is part of a much wider system extending to the Thames Estuary. Fieldwork would be required to substantiate the antiquity of the landscape form, although there are hints that certain routes and boundaries have been altered between the medieval period and the present day (which reflects the mid 19th century landscape) and many boundaries are so straight that they almost certainly relate to Inclosure of open fields. Notably the north-south alignment of the parish boundary between East and West Horndon does not follow the line of Tilbury Road, as might be expected, but lies within open landscape (within the Site) to the west. As such it possible that archaeological traces beneath of this notional boundary line might be present.

6.9 Medieval East Horndon was focussed on the high ground around the church, with the principal manor for West Horndon commensurate with the former Thorndon Hall. It is therefore unlikely that medieval hamlet/village sized archaeological sites are present within the Site. There is also a low potential for former moated sites as the extant scatter within the landscape around the Site suggest an evenly distributed dispersed settlement pattern and the Site area between is likely to have been farmland. There remains a low-medium potential for archaeological remains of lower status estate workers within the Site. These may be of low to medium significance.

6.10 The medieval archaeological remains of Thorndon Hall and the conjoined St Nicholas Church Scheduled Monuments are of high significance. Although there are no physical impacts to the SMs any visual effect to their setting will need to be assessed in relation to English Heritage guidance on setting (EH 2011) as design principles and screening mitigation proposals are developed. Although screened to a large degree the same will apply to the Grade II* listed 15th century Church of All Saints.

iv. Post-Medieval

6.11 Many of the surviving elements of landscape at the Site are likely to be of post-medieval rather than medieval date. This is suggested by the very straight nature of most of the field boundaries (ancient boundaries tend to exhibit irregularities) with associated immature hedgerows exhibiting low species diversity. Although the basic framework of the landscape may be more ancient most of these boundaries may reflect enclosure of former open fields. Ponds within the Site may date from the period whilst a mill was located to the east side of Tilbury Road. Given the present settlement pattern and the rural nature of the Site (that has barely changed since the 1840ôs) it is considered unlikely that significant elements of post-medieval settlement or landscape are present as archaeological sites/features within the Site.

6.12 Thorndon Hall SM has post-medieval phases, elements of which remain extant (such as the Pigeon Mount and surviving elements of the Hall foundations within õRuin Woodô As above the visual setting of the SMôs will need assessment in accordance with EH guidance in due course given inter-visibility with parts of the Site from the monument.

6.13 The post-medieval Grade II Listed Buildings of medium significance, within the Study Area are largely screened by high hedgerows and topography from the Site.

c) <u>Impact</u>

6.14 There are no known archaeological sites, features or finds that would be impacted at the Site although there is potential for presence of currently unknown archaeology. It is considered likely that infrastructure, foundations and landscaping will impact presently unknown but restricted areas of archaeology to varying degrees (to be determined via evaluation).

6.15 There are likely to be visual impacts to the setting of the SMôs with a possible minor loss of significance following construction.

d) <u>Effect</u>

6.16 Based on the matrix approach set out above, with the current state of knowledge there effect on archaeology is likely to be Neutral to Moderate before mitigation. Should archaeological remains be identified via evaluation (e.g. geophysics & trial trenching) they would be required to be excavated ahead of construction impact, thus providing mitigation by record. In such circumstances the overall effect on archaeology of low-medium significance following mitigation is likely to be Minor.

6.17 In terms of the Setting of Listed Buildings and Old Thorndon Hall/St Nicholasô Church SMôs Rummy Design (2013) noted that:

> **ô...the low level topography of the land combines to significantly limit visibility...from the surrounding land to the south, east and west...Open views are possible from the footpaths and public access land associated with the Thorndon County Park South. These views are sensitive and frequented by many visitors. Nonetheless the expansive views experienced from Thorndon Country Park south are defined by a mix of both rural and urban elements. Industrial elements such as chimneys and factories and infrastructure elements such as bridges and large roads define the character of the views from the park.**

Existing vegetation within the east site and the Thorndon Country Park south limits the visibility...from western sections of the Country Park. In contrast, the west site is very open, lacking strong vegetation network and is highly visible when viewed from western sections of the park...

A strong network of landscape structure planting would integrate the development of the east site into the wider landscape in time. The existing hedgerow network should be retained and bolstered with new tree planting. New hedgerows and tree planting...will help to integrate the development into the landscape and reduce its visibility from the Thorndon Country Park South. It is assessed that any visual harm resulting from the development of the east site could be limited through mitigation planting...It is therefore concluded that a landscape led approach...will not give rise to any significant landscape and visual effects and will enhance landscape character and restore lost landscape features typical of the area....

Drivers for the masterplan
• strengthen the existing network of landscape structure to mitigate development on the site
• selectively add additional hedgerows to further assist in mitigating development impact'

6.18 The report notes that the heavily trafficked A127, a major east-west corridor, separates the SM from the Site. However, the Thorndon Country Park Conservation Area and Historic Park and Garden extend to the south of the A127 to immediately north of the Site, they conclude; *'the site is adjacent to a protected landscape and therefore should have boundary protection to retain the character of the park*.'

6.19 The proposals are therefore likely to promote a woodland buffer to the southern edge of the Thorndon County Park (and commensurate Conservation Area/Historic Park & Garden).

7 SUMMARY AND CONCLUSION

7.1 Review of a range of archaeological and historical sources has provided information on the archaeological background to the Site. Geological information indicates that the Site area was situated within Pleistocene Head Clay with Holocene alluvium within a slight valley through the central area.

7.2 There are no known prehistoric, Roman or medieval sites or finds recorded on the HER within the Site. This is likely to reflect a lack of formal archaeological investigation. However, settlement of these periods is most likely to have been focussed, although not exclusively, on the adjacent higher ground. The current landscape form is likely to incorporate aspects of medieval as well as post-medieval date and buried evidence for landscapes of several periods is likely to survive in at least fragmentary form archaeologically. Archaeological fieldwork such as geophysics may be required to assist in the identification of any sites present, subject to further consultation with the Historic Environment Management (HEM). This may lead to further stage of evaluation and/or mitigation in the event of planning consent.

7.3 The most significant heritage asset within the vicinity of the Site is the Thorndon Hall/St Nicholasô Church Scheduled Monuments located to the north of the A128. The visual effects on the SMôs will require further assessment as the masterplanning process is developed and in consultation with English Heritage. Although some effects on the immediately adjacent Registered Park and Garden and Conservation Area are likely these may be largely possible to mitigate via woodland planting. The setting effects on these assets and to Listed Buildings (in particular the Church of All Saints which has inter-visibility with the Site) will also be subject to design led mitigation.

8 SOURCES

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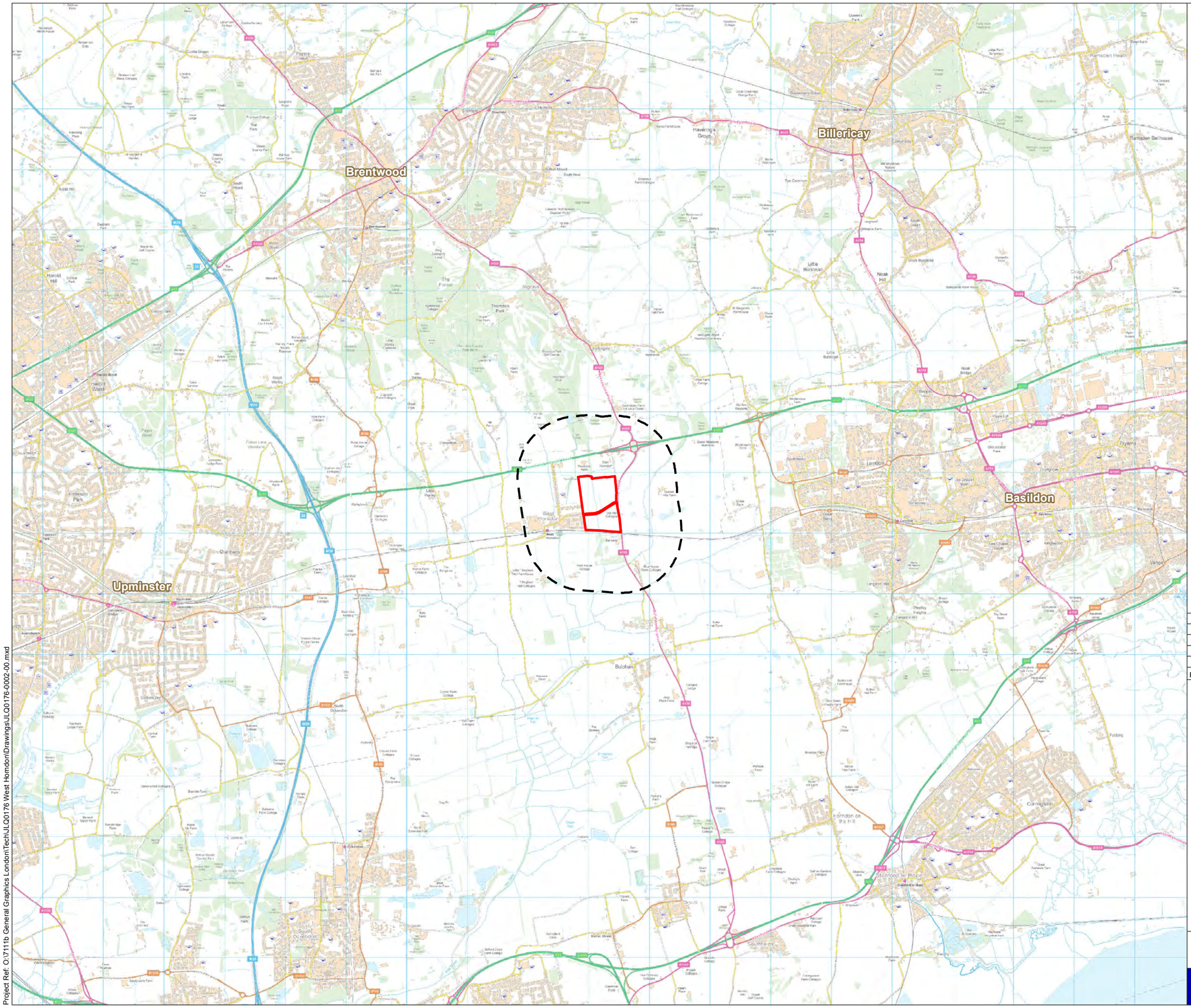
FIGURE 1 – SITE LOCATION



Legend

- Site Boundary
- 1km Buffer

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: Essex HER 2014

Status: DRAFT

RPS

20 Milton Park Abingdon Oxon OX14 4SH
T 01235 821888 F 01235 820351 E rpsox@rpsgroup.com W rpsgroup.com

Client: -

Project: Land East of West Hordon

Title: Site Location Plan

Scale: 1:60,000 @A3

0 1 2km

N

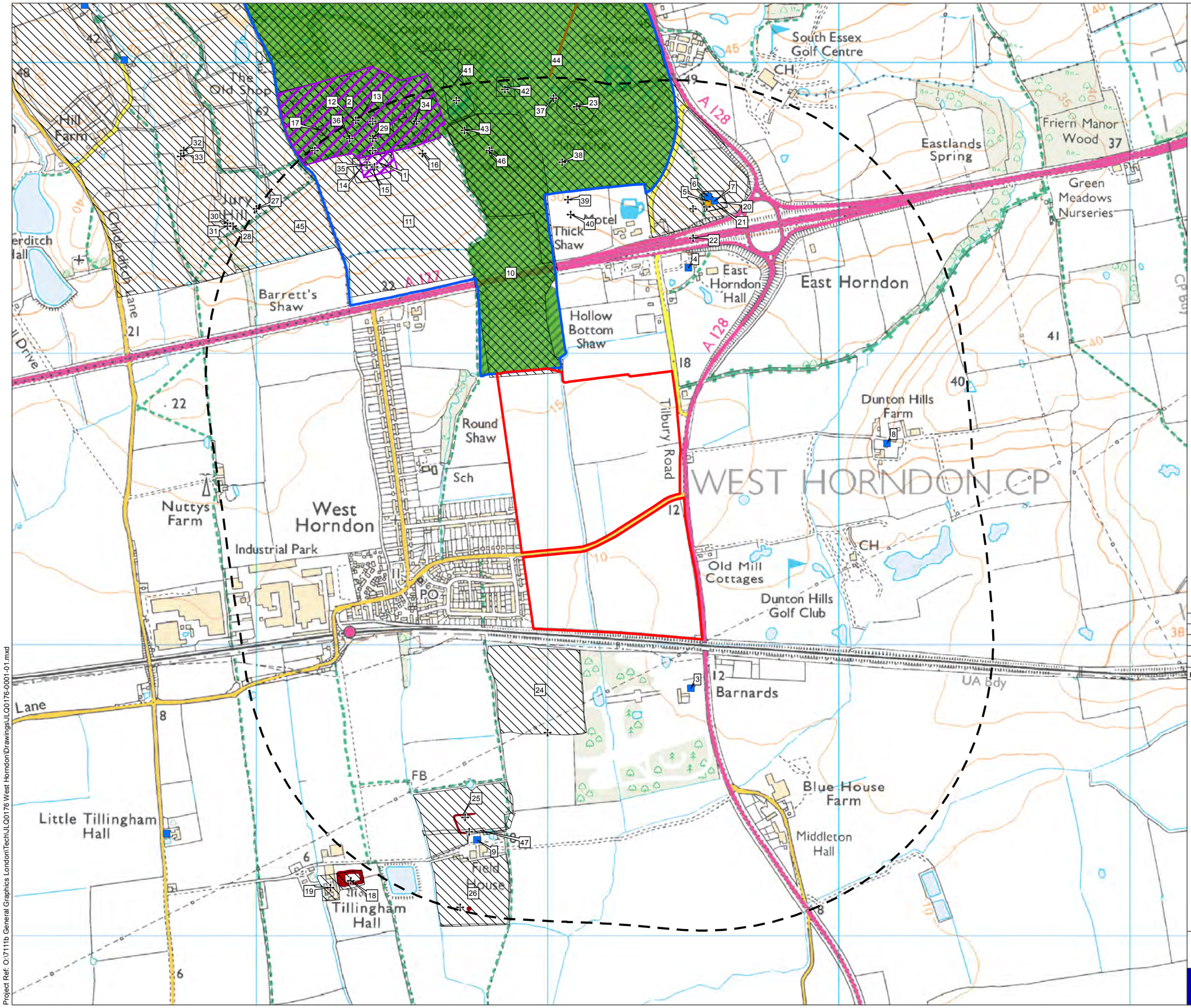
Date: Oct 2014 Datum: OSGB36 Projection: BNG

Drawn: MP Checked: RM Job Ref: JLQ0176

Figure No: 1 Revision: .

Project Ref: O:\7111b General Graphics London\Tech\JLQ0176 West Hordon\Drawings\JLQ0176-0002-00.mxd

FIGURE 2 – HISTORIC ENVIRONMENT RECORD



Legend

- Site Boundary
- 1km Buffer
- Scheduled Monument
- Registered Park / Garden

Listed Buildings

- Grade I
- Grade II*
- Grade II
- Conservation Area
- HER Feature
- HER Linear Feature
- HER Area Feature
- Features identified on aerial photography

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: Essex HER 2014

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Project: Land East of West Hordon

Title: Heritage Assets

Scale: 1:12,500 @A3

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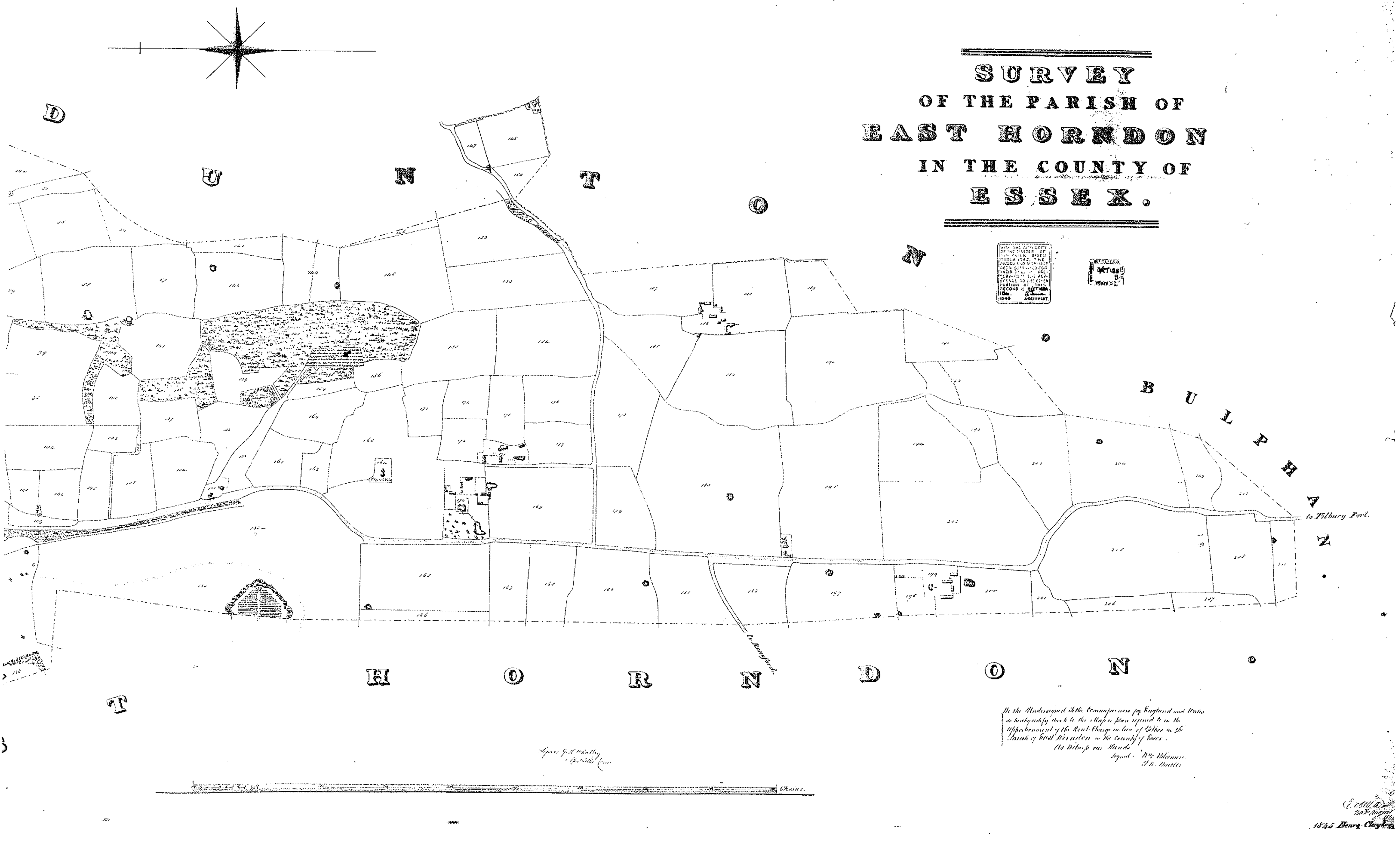
Date: Oct 2014 Datum: OSGB36 Projection: BNG

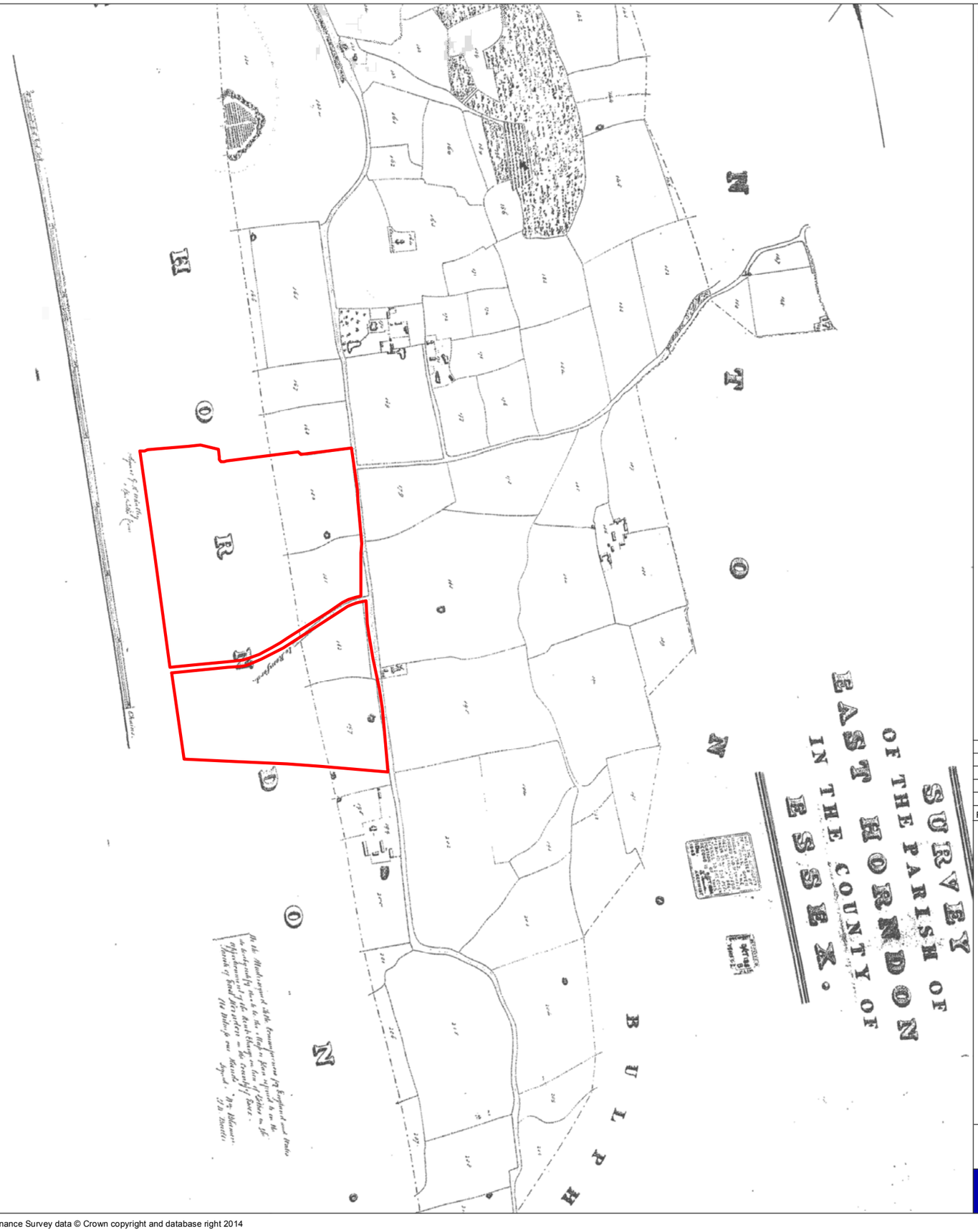
Drawn: MP Checked: RM Job Ref: JLQ0176

Figure No: 2 Revision: .

Project Ref: O:\7111b General Graphics London\Tech\JLQ0176 West Horndon\Drawings\JLQ0176-0001-01.mxd

FIGURE 3 – EAST HORNDON TITHE MAP 1845


SURVEY
OF THE PARISH OF
EAST HORNDON
IN THE COUNTY OF
ESSEX.
D U N T O N
B U L P H A N.
H O R N D O N
T
to Tilbury Fort.
to Brentwood.
WITH THE AUTHORITY OF THE MASTER OF THE ROLLS, GIVEN MARCH 1942, THE AWARD AND MAP HAVE BEEN SEPARATED FOR THEIR BETTER PRESERVATION. REFERENCE TO THE OTHER PORTION OF THIS RECORD IS
ARCHIVIST
Chains.
We the Undersigned Tithe Commissioners for England and Wales do hereby certify this to be the Map or Plan referred to in the Apportionment of the Rent Charge in lieu of Tithes in the Parish of East Horndon in the County of Essex.
As Witness our Hands
Signed: Wm. Blamire.
T. W. Buller
1845 Henry Clayton



Legend

Site Boundary

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Client: -

Project: Land East of West Hordon

Title: East Horndon Tithe Map 1845

Scale: 1:12,500 @A3

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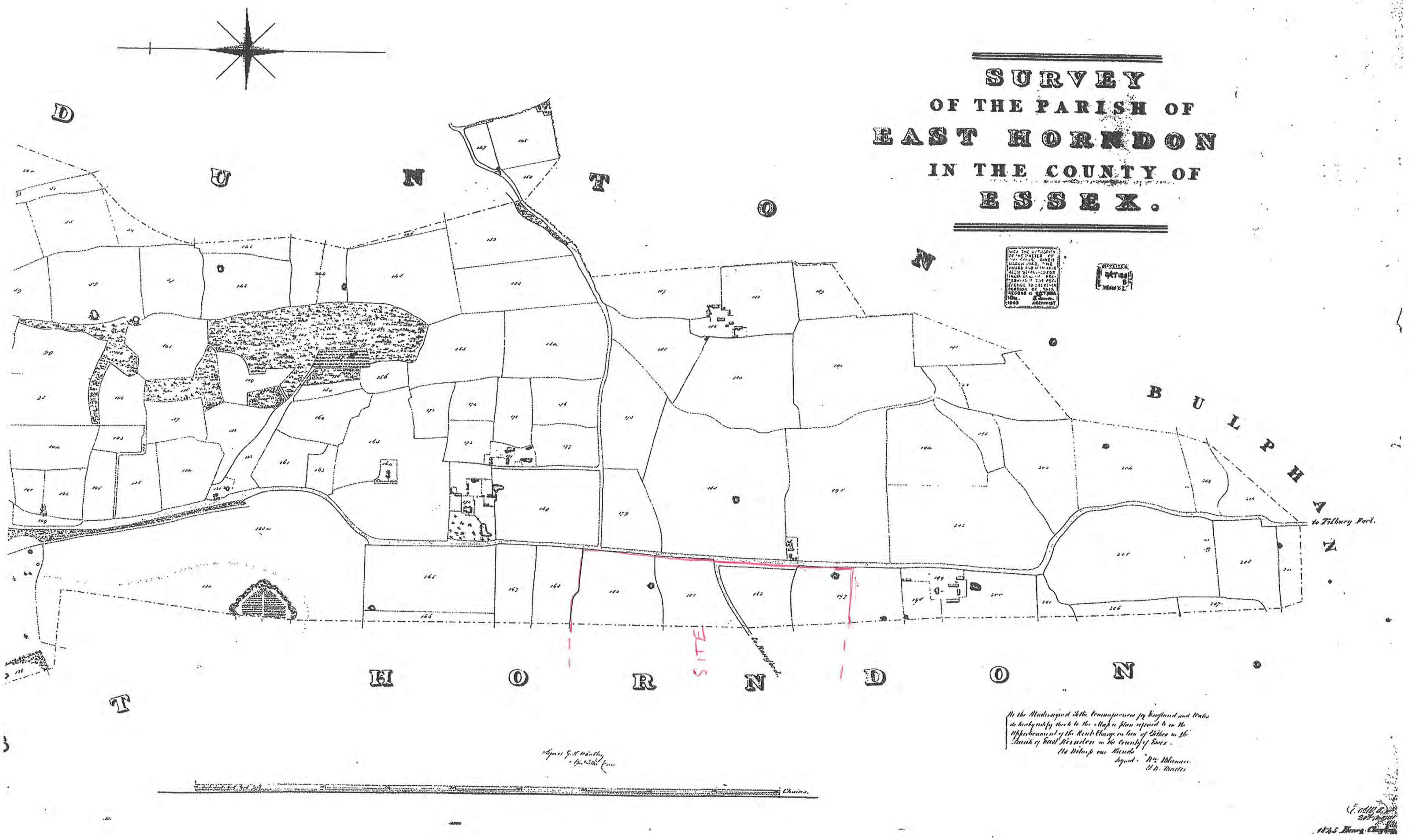
Date: Oct 2014 Datum: OSGB36 Projection: BNG

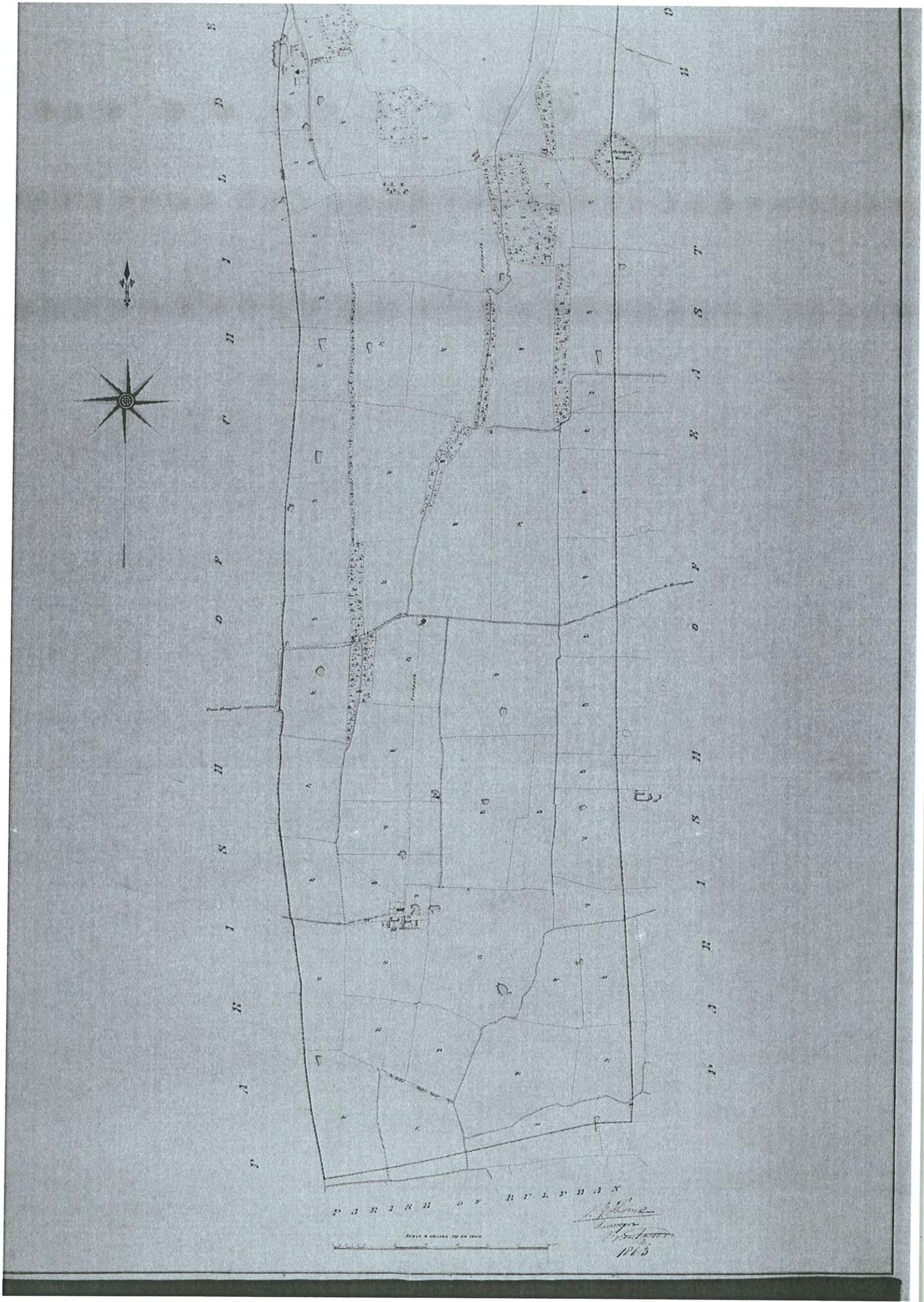
Drawn: MP Checked: RM Job Ref: JLQ0176

Figure No: 3 Revision: .

Project Ref: O:\7111b General Graphics London\Tech\JLQ0176 West Horndon\Drawings\JLQ0176-0004-00.mxd

FIGURE 4 – WEST HORNDON TITHE MAP 1863


SURVEY
OF THE PARISH OF
EAST HORNDON
IN THE COUNTY OF
ESSEX.
D U N T O N
B U L P H A N
T H O R N D O N
to Tilbury Fort.
SITE
Chains.
1845


PLAN OF BURNHAM
SCALE 8 CHAINS TO AN INCH
1863

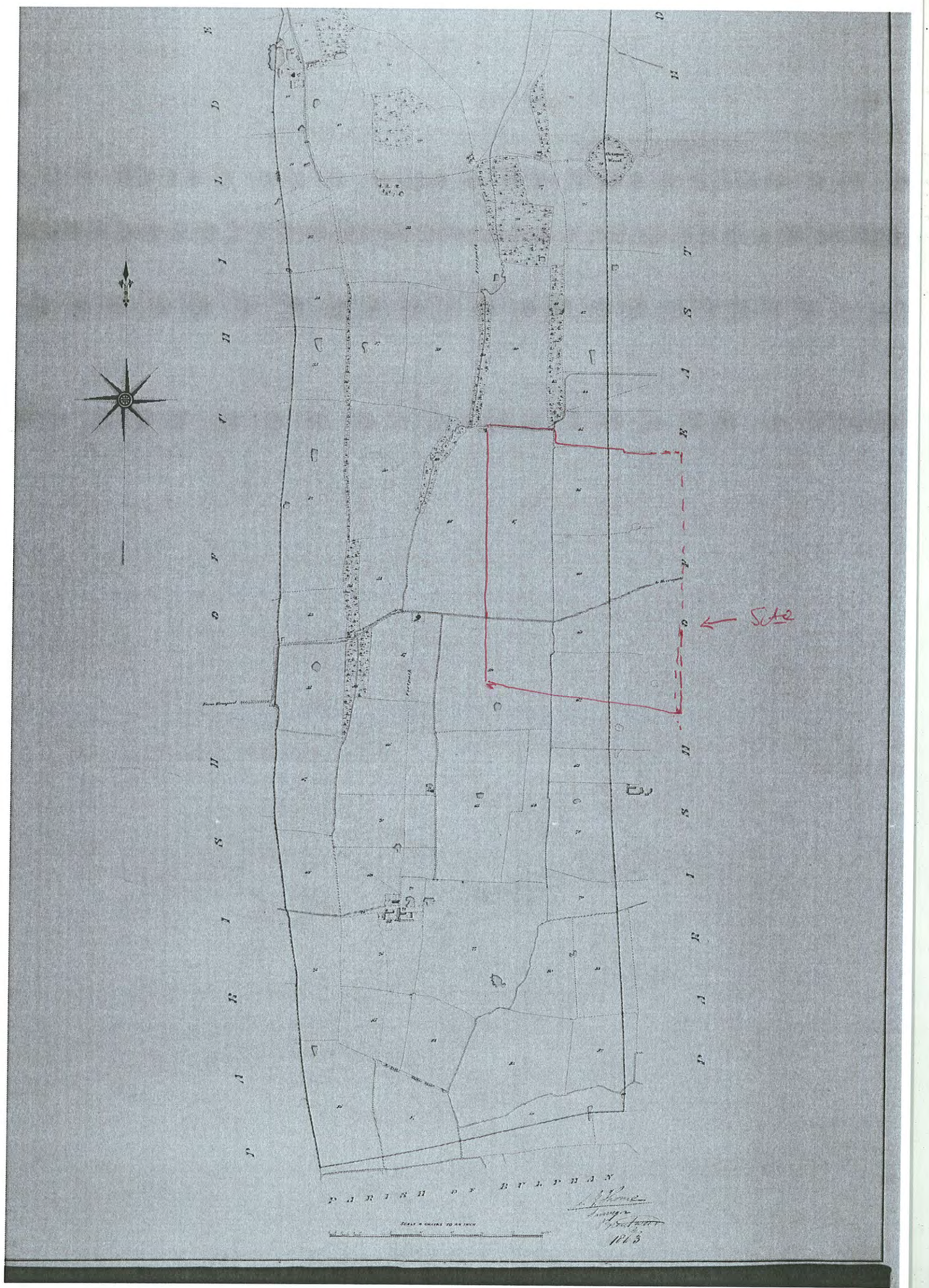
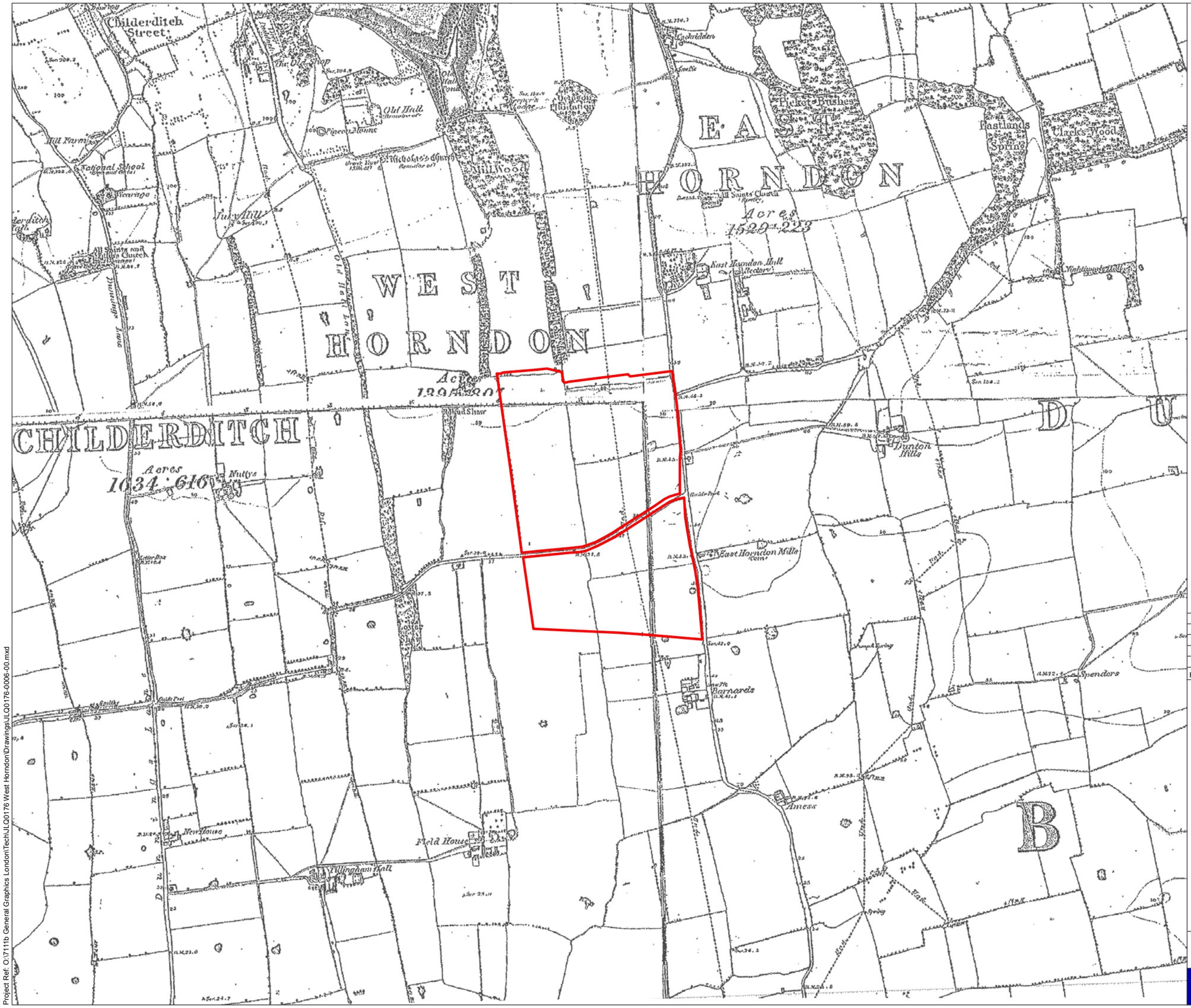

Site
PARISH OF BALPHAIN
SCALE 6 CHAINS TO AN INCH
1863

FIGURE 5 – FIRST EDITION OS 1872



Legend

Site Boundary

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: Essex HER 2014

Status: DRAFT

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Client: -

Project: Land East of West Hordon

Title: First Edition OS 1:10,560 1872

Scale: 1:12,500 @A3

0 0.25 0.5km

N

Date: Oct 2014 Datum: OSGB36 Projection: BNG

Drawn: MP Checked: RM Job Ref: JLQ0176

Figure No: 5 Revision: .

Project Ref: O:\7111b General Graphics London\Tech\JLQ0176 West Horndon\Drawings\JLQ0176-0006-00.mxd

APPENDIX 1 – HER DATABASE

RPS No	DesigUID	MonUID	EHCR_NO	Record Type	EH List No	Name	Description	Date
1	DEX3630		1851	SM	1021225	Former parish church and churchyard of St Nicholas		
2	DEX3631		1849	SM	32473	Old Thorndon Hall and Gardens		
3	DEX22119	MEX1010565	35159	LBII	119617	BARNARDS	HOUSE	C18
4	DEX11356	MEX1002814	27434	LBII	373564	East Horndon	TIMBER FRAMED HOUSE	C16
5	DEX11283	MEX1002658	27279	LBII*	373371	Church of All Saints	CHURCH	C15
6	DEX11632	MEX1002659	27280	LBII	373372	Stabling at Curch of All Saints	TIMBER FRAMED BUILDING	C17
7	DEX11284	MEX1002660	27281	LBII	373373	Freman monument in churchyard of Church of All Saints	TOMBSTONE	C18
8	DEX11540	MEX1002813	27433	LBII	373563	Dunton Hills	TIMBER FRAMED HOUSE	C17
9	DEX22122	MEX1010581	35175	LBII	119627	FIELD HOUSE	HOUSE	C16
10				RPGII*	1000314	Thorndon Hall Registered Park & Garden		
11	DEX22830			CA		Thorndon Park Conservation Area		
12	12356	MEX6695	1849	MON		Old Thorndon Hall, West Horndon	HOUSE, WALL, MOAT, HOUSE, HOUSE, MOAT, DESERTED SETTLEMENT, DEER PARK	
13	3984	MEX6707	1850	MON		Old Thorndon Hall, West Horndon	GREAT HOUSE, GREAT HOUSE, WALL, BAKEHOUSE, STABLE, BARN, ENCLOSURE, GARDEN, BUILDING, GATEHOUSE, GARDEN WALL, DEER PARK, POND, WATERMILL, FIELD BOUNDARY, TRACKWAY, GREAT HOUSE, WATERCOURSE, ZOO, DAM, MOUND, PARK, BOUNDARY	
14	4629	MEX6710	1851	MON		Site of St Nicholas's Church, West Horndon	CHURCH, CHURCHYARD, DITCH, HUMAN REMAINS, BUILDING, FLOOR, SETTLEMENT	
15	507	MEX6719	1852	MON		Site of St Nicholas's Church, West Horndon	CHURCH, CHURCH, HUMAN REMAINS, CHURCHYARD, CHURCH, BUILDING, FLOOR, SETTLEMENT	
16	29829	MEX6720	1853	FS		East of site of St Nicholas's Church, West Horndon		
17	4255	MEX6721	1854	MON		West Horndon - Old Thorndon Hall, `Pigeon Mound'	LANDSCAPE PARK	
18	11146	MEX6845	1873	MON		Childerditch-Tillingham Hall Farm	MOAT	
19	1662	MEX6850	1874	MON		Little Tillingham Hall Farm	HOUSE	
20	9188	MEX17748	5154	MON		Church of All Saints, East Horndon	CHURCH, FONT, TOMB, CHURCH, COFFIN, ARCHITECTURAL FRAGMENT, ARCHITECTURAL FRAGMENT, VAULT, BUILDING	
21	9111	MEX17752	5155	MON		Church of All Saints, East Horndon	CHURCH, BUILDING	
22	20369	MEX17754	5156	FS		Near Churchyard		
23	13670	MEX31339	9964	MON		The Octagon, Thorndon Country Park	GARDEN, GARDEN	
24	13283	MEX41054	16254	MON		Fieldhouse	RING DITCH	
25	6646	MEX41056	16255	MON		Fieldhouse	LINEAR FEATURE, FIELD BOUNDARY, RECTANGULAR ENCLOSURE	

26	2831	MEX41058	16256	MON	Fieldhouse	BOMB CRATER, RECTANGULAR ENCLOSURE, RING DITCH
27	29016	MEX43308	16997	FS	Thorndon Country Park, Area A, field 7	
28	29017	MEX43309	16998	FS	Thorndon Country Park, field 7, Jury Hill	
29	29020	MEX43313	17000	FS	Thorndon Country Park, south of the Old Hall	
30	29021	MEX43314	17001	FS	Thorndon Country Park, Jury Hill	
31	29022	MEX43315	17002	FS	Thorndon Country Park, Jury Hill	
32	29023	MEX43316	17003	FS	Thorndon Country Park, Roman pot east of Childerditch Brook	
33	29024	MEX43317	17004	FS	Thorndon Country Park, medieval pot east of Childerditch Bro	
34	11436	MEX43318	17005	MON	Thorndon Country Park, post medieval pottery around Old Hall	WALL
35	29026	MEX43319	17006	FS	Thorndon Country Park post-medieval tile near St. Nicholas'c	
36	29030	MEX43322	17009	FS	Thorndon Country Park, Roman brooch	
37	13522	MEX1032267	18635	FS	Halfway House to Herongate Reservoir Triplication Scheme	
38	13523	MEX1032268	18636	FS	Halfway House to Herongate Reservoir Triplication Scheme	
39	13524	MEX1032269	18637	FS	Halfway House to Herongate Reservoir Triplication Scheme	
40	13525	MEX1032270	18638	FS	Halfway House to Herongate Reservoir Triplication Scheme	
41	9865	MEX1034381	19615	MON	Old Hall Pond - Thorndon Park	POND
42	13671	MEX1034377	19618	MON	East of Old Pond hall - Possible moated site - Thorndon	MOAT
43	7424	MEX1034379	19619	MON	Old Thorndon Hall - Possible Mill site and unknown feature	WATERMILL
44	54	MEX1035092	19884	MON	Shonks Mill to Navestock water pipeline, Essex. An Archaeological Watching brief.	PIT
45	1051	MEX1037644	20828	MON	Thordon Park in World War Two	MILITARY CAMP
46	6073	MEX1036764	45543	LND	Mill Wood, Thorndon Country Park	WOOD, EARTHWORK
47	2312	MEX1040872	48073	MON	Cranham Cable Trench, West Horndon	DITCH

APPENDIX 2 – AERIAL PHOTOGRAPHS EXAMINED

Oblique:

28th September 1948 ï RAF_540_109_SFF0 (x8)

14th July 1995 ï TQ6387_1 (ExC 16579_09) (x1)

Vertical:

2nd March 1944 ï RAF_HLA_686_RA (x1)

26th March 1944 ï RAF_HLA_694_RP (x3)

4th July 1944 ï RAF_106G_LA_21_RS (x5)

4th August 1944 ï RAF_106G_LA_26_RS (x3)

10th September 1944 ï RAF_106G_LA_38_RP (x2)

11th February 1946 ï RAF_3G_TUB_UK_66_V (x4)

7th June 1946 ï RAF_106G_UK_1563_RS (x2)

11th October 1946 ï RAF_CPE_UK_1788_RP (x2)

12th May 1951 ï RAF_58_679_Vp2 (x1)

31st May 1951 ï RAF_58_699_Vp2_5137 (x3)

4th June 1951 ï RAF_58_715_Vpl (x6)

30th April 1952 ï RAF_540_720_RS (x2)

4th March 1955 ï RAF_540_1543_F22 (x3)

6th June 1955 ï RAF_82_1213_V (x1)

6th July 1955 ï RAF_82_1230_F21 (x2)

10th October 1955 ï RAF_82_1315_F21 (x6)

4th August 1955 - RAF_542_233_F22 (x3)

28th August 1961 ï RAF_58_4646_F43 (x3)

24th September 1964 ï OS_64211_V_68 (x2)

18th August 1965 _ MAL_65076_V (x2)

25th September 1965 ï MAL_650085_V (x3)

2nd June 1968 ï MAL_68037_V (x10)

13th November 1970 ï MAL_70085_V (x4)

1st July 1976 ï MAL_76O56_V (x2)

10th March 1995 - OS_95019_V_108 (x6)

TM

PROVIDING TRUSTED ECOLOGICAL ADVICE

WEST HORNDON, EXTENDED PHASE 1 SURVEY

Project	Prepared By	Approved by	Client	Status	Date
RGA051	A.R. Graves CEcol CEnv FCIEEM	A.R. Graves CEcol CEnv FCIEEM	Countryside Properties (UK) Ltd	DRAFT F/C	JAN 15

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All Richard Graves Associates staff are members of, at the appropriate level of the Chartered Institute of Ecology and Environmental Management (CIEEM) and subscribe to its code of professional conduct in their work. In accordance with the code limitations to the methods, results and conclusions will be accurately stated and any biological records collected as part of the project will be supplied to the appropriate local records centre one year after the date of issue of the report unless otherwise agreed.

Contents

1. Summary

Richard Graves Associates undertook an ecological survey of land to the east of West Horndon, Essex in October 2014.

The survey included:

- Phase 1 Habitat Survey
- Protected Species Walkover
- Water Vole Assessment
- Desktop Study

The site does not include and is not near to any protected or ecologically sensitive habitats and the majority of the site is of low ecological value. A protected species, barn owl was recorded during the survey together with some suitable habitats for bats.

The report concludes that if the recommendations are followed the site can be successfully developed without significant harm to wildlife and that there are opportunities for enhancement.

2. Introduction

Instruction

Richard Graves Associates were instructed by Countryside Properties (UK) Ltd to undertake ecological surveys for land at West Horndon in the district of Brentwood, Essex. It is understood that the development proposals include the construction of approximately 450 new homes and associated infrastructure and landscaping.

Location

The total site area comprises of 148.5 hectares (ha) of primarily agricultural land approximately centred at Ordnance Survey (OS) grid reference: TQ 63172 88506. The site is divided into two sections (north and south) by Station Road and extends to the east with a boundary with Tilbury Road (A128). The southern boundary runs parallel to the mainline Fenchurch Street to Shoeburyness railway line. The western boundary comprises the suburban development of West Horndon and arable land with arable land to the north up to the A127 arterial road.

Assessment

The assessment is an Extended Phase 1 survey which includes an assessment of evidence of and suitable features for protected species and some more detailed protected species survey. Protected Species are those, which are fully or partially protected by legislation. The relevant legislation includes:

- The Conservation of Habitats and Species Regulations 2010 (HMG, 2010)
- The Wildlife and Countryside Act 1981 (as amended) (HMG, 1981)
- The Protection of Badgers Act 1992 (HMG, 1992)

Consideration of species listed in Section 41 of the Natural Environment and Rural Communities Act (HMG, 2006), which are regarded as of principal importance in England is also included, as appropriate.

The site has been addressed without reference to any particular development proposal as a number of options are currently under consideration. However it is assumed that impacts will relate to a scale of development of approximately 450 new homes and associated infrastructure and landscaping.

3. Methods

Extended Phase 1 Survey

The Extended Phase 1 Survey is described in *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment, 1995). This approach is based on: *A Handbook for Phase 1 Habitat Survey* (JNCC, 2010 (Revised)), which includes classification of basic habitats and standard mapping, to which are added a desktop survey and a protected species walkover. The standard for Phase 1 plans, which include the use of target notes, is amended as the 'target notes' are also presented as GPS waypoints on a Google Earth-Pro aerial view. This aids accuracy as the observations are geo-referenced to +/- 5 metres and may be easier to interpret for non-specialists.

Desktop Study

Baseline data for protected sites and protected species is held for most parts of the country, some of this, in particular protected sites, is open source (freely available) and some, in particular species information, may be supplied by local records centres for a charge. Given the location of the site in West Horndon (Essex) the following sources have been used:

- Essex Field Club
- Brentwood Strategic Environmental Assessment (Essex County Council, 2007)
- Brentwood LoWS Review (Knowles, 2012)

A desktop study from the local records centre from Essex Field Club was obtained and is supplied in its entirety as a separate report.

Protected Species Walkover and Phase 1 Survey

The site was visited for the Phase 1 by Richard Graves and Phil Bolton on the 27th October 2014. The proposed application (red line) boundary of the site was surveyed but the survey area extended to the existing field boundaries where they extended beyond the red line. Habitats were identified and are plotted on a map (Figure 3, Appendix A); botanical species were recorded and are noted in the text using nomenclature in accordance with (Stace, 2010) and (Veldhuijzen Van Zanten, 2010). Features within the site suitable for, or indicating evidence of protected species and species of nature conservation significance were recorded using a Global Positioning System (GPS) application (Peto, 2010).

Water Vole Survey / Inspection

A more detailed inspection of the ditch / water course was conducted in accordance with survey methods specified in *The Water Vole Conservation Handbook 3rd Edition* (Strachan, 2011) by two experienced surveyors to record features typical for this species including: suitable holes in banks, typical vegetation cropping patterns (lawns) and the distinctive droppings in conjunction with the phase 1.

Surveyor qualifications and experience

Richard Graves
Richard Graves BSc (Hons) MSc PGDip CEcol CEnv FCIEEM has over twenty years' experience as a practising ecologist and has undertaken, commissioned and reviewed several hundred Extended Phase 1 and protected species surveys all over the UK. Richard is a fellow of the Chartered Institute of Ecology and Environmental Management (CIEEM) a chartered ecologist and a chartered environmentalist. Richard is also class licenced for great crested newt surveys, a class licenced bat surveyor and author of current good practice guidelines for bat surveys.

Phil Bolton
Phil Bolton BSc (Hons) ACIEEM MACMA is an experienced ecological consultant with a thirty year background in conservation management and lecturing. He has survey licences for dormice and bats and additional expertise in bird and aquatic invertebrate surveys.

Limitations
The Phase 1 Survey was undertaken just outside of the appropriate time of year for Phase 1 surveys (March – September). Certain species of flora, which flower earlier in the year, may not have been apparent. Given the nature of the habitats present this limitation is not considered to be significant. The survey date was later than ideal for water voles but would have allowed for suitable features to be recorded. The survey was conducted too late in the year to record bird breeding behaviour.

4. Results and Evaluation

Desktop Study

The desktop studies requested from Essex Field Club are supplied in their entirety as Appendix C (Essex Recorders Partnership, 2014). The desktop report provides up to date information with respect to nationally protected sites within 5 km. Additional background information available from Brentwood Borough Council (BBC), which includes: a Strategic Environmental Assessment (SEA) (Essex County Council, 2007) and a Local Wildlife Sites (LoWS) review (Knowles, 2012) have also been assessed.

The following sites, habitats and species information are summarised and evaluated below.

Statutorily Protected Sites

There are no European Protected Special Areas of Conservation (SAC) within the desktop search area. There are no Special Protection Areas (SPA) within the desktop search radius, so no impacts from the development and construction of new housing at this site are anticipated.

There are three Sites of Special Scientific Interest (SSSI) within the 5 km desktop search radius:

- Basildon Meadows
- Ingrebourne Marshes
- Thorndon Park

The nearest SSSI and the only one within 2 km is Thorndon Park, which, at its nearest extent is within 500 m of the site. The citation for the SSSI is included in Appendix C. However it is separated from it by the major barrier formed by the Southend Arterial Road (A127), so most direct ecological impact from development are unlikely. The occupation of 450 new homes will result in an increase in population by approximately 1,000 people, which could increase recreational pressure on Thorndon Park. However as the SSSI is part of a larger area managed as a Country Park, with intensive recreational use promoted from a much wider catchment, this impact is unlikely to be significant.

Local Nature Reserves are designated under the National Parks and Access to the Countryside Act (HMG, 1949) and managed for the benefit of nature conservation.

There are 5 Local Nature Reserves (LNRs) within the 5 km search radius:

- Cranham Brickfields
- Cranham Marsh
- Ingrebourne Valley
- Mill Meadow
- The Manor

None of these LNRs are within the 2 km search radius, so impacts as a result of development at West Horndon are unlikely.

Non-statutory Sites

Sites which are not of national significance but may contain features important for wildlife may be designated and given some protection under the planning system. In Essex these are known as Local Wildlife Sites (LoWS). The details for LoWS are provided in the review of Brentwood sites (Knowles, 2012). There is one LoWS recorded within the desktop search area, which is the part of Thorndon Park, not included in the SSSI designation. In addition two areas of woodland included in the Ancient Woodland inventory (P.26 (Essex Recorders Partnership, 2014)) are located immediately to the north and approximately 200 m to the west of the site. Ancient woodlands are those know to have been continuously wooded since at least 1600 and are usually considered to be of high ecological value. Aerial images indicate that these areas are assart hedges, which are the relict remaining as hedges after woodland has been cleared for other land uses. As the immediate surrounding land uses appear to be recreational (school playing fields) and agricultural (arable)

Habitats

Habitats in Essex have not been subject to a detailed programme of habitat surveys. Aerial images indicate that the site is typical of many parts of Essex, comprising a relatively flat agricultural landscape dominated by arable production.

Species

The following protected species were recorded within the 2 kilometre search radius:

Table 1 – Desktop Protected Species Records

Proper Name	Trivial Name	Most Recent Record
Anguis fragilis	Slow worm	2012
Arvicola amphibius	Water vole	2010
Lacerta vivipara	Common lizard	2012
Meles meles	Badger	2013
Myotis daubentonii	Daubenton's bat	1997
Natrix natrix	Grass snake	2012
Nyctalus noctula	Noctule	1999
Pipistrellus pipistrellus	Common pipistrelle	1997
Pipistrellus pygmaeus	Soprano pipistrelle	2010
Triturus cristatus	Great crested newt	2006

Records more than five years old are to be regarded as of historic interest only. None of the species records are from within or adjacent to the application site. The relatively recent record for soprano pipistrelle is from Thorndon Country Park to the north Records for great crested newt, slow worm and grass snake are associated with Thorndon Country Park. The record for common lizard is located more than 1 km to the east of the site at Dunton. There are several recent records for badgers, which suggest an active recording effort in the wider area.

Of potential interest is the relatively recent record of water vole approximately 2 km to the south west of the site. As water voles have undergone a significant decline in population and range over the last two decades and are now extinct in many parts of the country recent records (if correct) are uncommon.

Phase 1 Survey

Site Description

The site is divided by existing boundaries into four main fields. The two western fields (north and south of Station Road) the entire south-eastern field and part of the central north-eastern field are currently under cultivation. Most of the north-eastern and eastern central fields are currently used as improved pasture, while the western section of the north-eastern field currently appears to have been left as 'set-aside' land currently dominated by ruderal species. The site is bisected by a ditch, running north to south, which is culverted under Station Road and continues through a culvert under the railway embankment to the south.

Figure 1 below indicates waypoint locations of habitats and features of interest recorded during the survey.

Figure 1: Survey Waypoint Locations

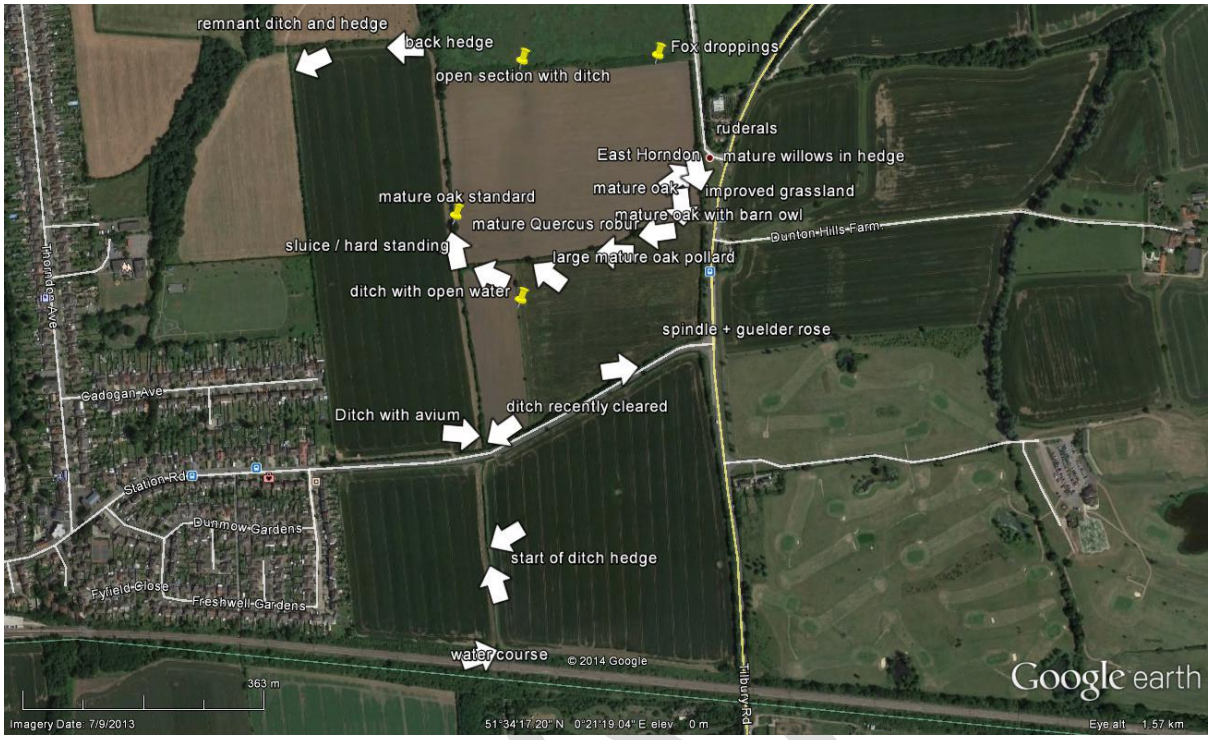

Image © Google Earth Pro (Base Image 2013)

Habitats

The habitats recorded on site included: hedges and tree, improved grassland, ruderal habitats and cultivated land, running / open water

Agricultural / Cultivated Land

The largest area of habitat (about two thirds of the total) within the site comprises cultivated land, which at the time of the survey had been recently ploughed and harrowed. This bare ground / arable habitat is of low ecological value.

Hedges and Boundaries

The site retains some original field boundaries including hedges, particularly north of Station Road. The retained hedge types include species rich hedges with trees, species poor hedges with trees and defunct and intact species poor hedges. The hedges forming the western boundary is defunct and species poor to the south of Station Road, comprising mainly of occasional *Crataegus monogyna* hawthorns, defunct and species poor where it is adjacent to housing to the west and mostly intact and dominated by hawthorn and *Prunus spinosa* blackthorn for the rest of its length. The hedge forming the northern boundary of the western field is of the same character and species mix.

The eastern boundary of the western field, north of station road comprises of a gappy / defunct hedge with several mature *Quercus robur* pedunculate oak and *Salix* sp. willow

trees and hawthorn with a ditch. The boundary of the south western field south of Station Road comprises of a ditch with a defunct hedge comprising occasional hawthorn and willow.

The northern boundary of the eastern field comprises a hedge of dense hawthorn and blackthorn scrub.

The eastern boundary of the site comprises of an intact species poor hedge of hawthorn with occasional mature oaks to the north of Station Road and an intact species poor hedge comprising mostly hawthorn and blackthorn along the eastern boundary of the field south of Station Road.

The hedge forming the boundary between the two fields forming the north-western section of the site is defunct and species poor, but does include one larger mature oak with a hollow bole.

The hedge which forms the boundary to the north of station road is intact and species rich, comprising of oak, hawthorn and blackthorn and appears to have been reinforced with planting of additional species including: *Fraxinus excelsior* ash, *Carpinus betulus* hornbeam, *Euonymus europaeus* spindle, *Viburnum opulus* guilder rose and *Cornus sanguinea*.

The hedges within the site are not of high intrinsic ecological value, although the do form important corridors for foraging and commuting wildlife, shelter for roosting and nesting and include some mature oak trees

The southern boundary of the site with the rail corridor is a chain link fence.

Grassland

The majority of the north-eastern section of the site comprised of improved grassland, apparently managed as hay crop. This grassland was of very low diversity; dominated by *Lolium perenne* perennial rye-grass with very occasional *Trifolium repens* white clover, *Bellis perennis* daisy and *Taraxacum officinale* agg. dandelion. This habitat is of low ecological value but does provide some cover and foraging for small mammals and birds.

Ruderal

A small section of the north-western field had been left uncultivated and comprised bare earth and ruderal species including: *Cirsium vulgare* creeping thistle, *Cirsium arvense* field thistle, *Rumex* sp. dock and *Senecio vulgaris* groundsel. This habitat is of low ecological value, but if left for a few years could develop additional ecological interest.

Water

The dich north of Station Road was mostly dry with occasional pools of open water and little in the way of aquatic vegetation. It appeared, from the presence of relatively fresh spoil to have been cleared recently (within the last two years).
The ditch south of Station Road contained continuous open water with aquatic vegetation including reeds: *Phalaris arundinacea* reed canary grass and *Phragmites australis* common read and other aquatic vegetation including *Sparganium erectum* branched bur-reed and *Apium nodiflorum* fools watercress.

Protected Species
The survey recorded features suitable for the following protected species:

- Breeding birds

Further species were recorded in the desktop study area (Essex Recorders Partnership, 2014), so their potential presence is addressed.

European Protected Species
European Protected Species (EPS) are those listed on Schedule 2 of the Conservation of Habitats and Species Regulations (HMG, 2010). The species and their habitats are fully protected and any activity likely to have an impact on them may require an EPS mitigation licence in order to proceed legally. Only those EPS which are terrestrial and known to be present in Essex are considered in this assessment.

Bats
The site includes features suitable for commuting and foraging bats (hedges and watercourses) and a limited number of potential roosting features (larger mature trees). The desktop records do not provide much in the way of useful information about the species and populations which may be present and using the site. As the site is currently rural in character and connected to some areas of suitable habitat with roosting opportunities in the wider area a typical assemblage of bat species (for south Essex) could be anticipated.

Great Crested Newts
The desktop study included records of great crested newt at Childerditch Pond (Essex Recorders Partnership, 2014) approximately 1 km to the north. However Childerditch pond is separated from the site by the major barrier of the A127 and there is no suitable breeding habitat on site or within 500 m of the site further consideration of this species is not required.

Dormice
Muscardinus avellenarius hazel dormouse has been recorded in Essex but is not recorded in the desktop report. The hedges within the site to not appear to be particularly suitable to support these species so further consideration of this species is not required.

Other Protected Species

Badgers

Badgers are protected under their own act: The Protection of Badgers Act (HMG, 1992), which is deals with welfare issues rather than nature conservation (as the species is relatively common and widely distributed). However the presence of badgers is regarded as a material consideration for planners.

No definitive evidence of badger activity was recorded within the site. However it was not possible to penetrate areas of dense scrub. There are several mammal paths around and leading beyond the site and it is likely that the site forms part of the local foraging range for badger clans. There are several badger records for the surrounding area which indicate a probable active local recording effort.

Water Voles

Water vole is listed on Schedule 5 of the Wildlife and Countryside Act (HMG, 1981) and is fully protected. This reflects the decline of populations and extinction throughout most of its range, though to result from predation by *Neovison vison* American mink and loss of habitat.

No field sign for or evidence of water voles was observed during the survey. While the banks of the ditch / water course appeared to have been relatively recently cleared (within the last two years), enough time should have elapsed for a rapidly breeding species to have re-established themselves if present. The section of water course north of Station Road is unlikely to be suitable for water vole due to a lack of open water and significant over-shading. The section south of Station Road includes open water and is not over-shaded but is also relatively limited in extent and cover. As the area is outside of the American mink control zones established in Essex, presence and therefore predation is likely. Therefore it is assumed that they are currently not present at the site.

Common Reptiles

There is little suitable habitat for common reptiles within the site other than some limited potential for slow worm around the margins and grass snake in the ditches. This will remain the case while mowing and / or grazing are maintained. The nearest known records of common reptiles are separated from the site by significant barriers.

Fully Protected Bird Species

A *Tyto alba* barn owl was recorded roosting in a tree during the survey during the survey which was apparently not pleased to be discovered. Barn owl is a fully protected bird listed on Schedule 1 of the Wildlife and Countryside Act (HMG, 1981). It will be necessary to establish whether this bird also nests on the site. Barn owls require significant open spaces with grassland and scrub as well as suitable nesting and roosting habitat (The Barn Owl Trust, 2012) and are particularly vulnerable to (literal) traffic impacts (The Barn Owl Trust, 2012). The development of new house may have a significant impact on the potential use of the landscape by barn owls.

Nesting Birds

All nesting birds are protected from disturbance under the Wildlife and Countryside Act. The nesting season is considered to be between March and August, although birds nesting at other times are also protected. The hedgerows within the site are the most significant foraging and nesting sites with some foraging provided by cultivated land and improved grassland (during re-seeding). Impacts on breeding birds are likely to be significant at the local level only.

Other Species

No other evidence of protected species was recorded during the survey and there are no relevant records of any other species included in the desktop records.

Species of Principal Importance

No evidence of habitat or field signs for species of principal importance in England was recorded during the survey.

5. Recommendations

The following section includes recommendations for further survey work and for the protection of wildlife and biodiversity prior to, and during, construction works, recommendations for minimising and mitigating impacts and includes potential mitigation and enhancement opportunities for the site.

Sites

Habitats

Ditches and Hedgerows

Although not of high intrinsic ecological value the hedgerows and main (running north to south) ditch are the most important features of the site. These may support several species and should be retained wherever possible. The retained hedges should be considered for restoration of traditional management including: laying and coppicing and pollarding for larger trees.

Ditches will need to be maintained and cleared occasionally to maintain their drainage and wildlife function. This should be accomplished with sensitivity to wildlife with respect to timing and in sections on a rotational basis (so that not all habitat is disrupted at the same time.

Large Mature Tree

The site contains a number of larger trees, including oak, mostly associated with the defunct hedge forming the eastern boundary of the north western field and the hedge running west to east across the north eastern fields. These larger trees provide habitat for barn owls and have bat potential and should be retained whenever possible. Consideration should be given to new / re-established pollarding, which may prolong the lifespan of the trees if undertaken sensitively.

Other Habitats

The cultivated, improved grassland and ruderal habitats are not of ecological value. Hence areas which are not developed for housing can be used to achieve ecological enhancement through planting and management of more diverse species mixes and the establishment of new water features with suitable aquatic planting.

Consideration of Lighting

In accordance with good practice and planning guidance (DCLG, 2012) lighting impacts during construction and operation of development should be considered. Lighting if used should be directed away from vegetation, trees and wildlife corridors. Advice on suitable lighting design can be obtained from guidance produced by the bat conservation trust / Institute of Lighting Engineers (The Bat Conservation Trust and Institute of Lighting Engineers, 2009).

European Protected Species

Bats

As bats appear to be under recorded in the area (Essex Recorders Partnership, 2014), there are suitable features for foraging and roosting and the project falls within the scope of chapter 9 (Graves, 2012) of *Bat Surveys Good Practice Guidelines* (Hundt, 2012) further surveys are required to establish the species and populations present and any roosting locations. The surveys should be undertaken during the active season for bat recording (March to October).

Other Protected Species and S.41 Species

Badgers

Protected features associated with badgers are mostly likely to be confined to the boundaries of the site. If development is proposed within 30 m of these boundaries a pre-construction badger survey should be undertaken immediately prior to the start of works.

Barn Owl

It will be necessary to assess all of the roosting location within the site and whether barn owl is nesting. Appropriate surveys should be undertaken during the early part of the nesting season (March – June). Retention / creation of open grassland habitats and speed restrictions to road within the development and haul roads during construction to below 30 mph should be considered to minimise and mitigate for potential impacts.

Nesting Birds

Any clearance of hedges scrub and trees within the site should be timed to avoid the bird nesting season (March to August). Where it is not possible to do so, vegetation should be inspected in advance by a suitably qualified ecologist to confirm that nesting birds are not affected, or comply with their further advice if they are.

General Provisions

A pre-construction survey should be completed immediately prior to the start of development works on the site to confirm that the situation on site is as reported here.

In accordance with good practice, retained habitat should be appropriately delineated and protected from construction activity. Compounds and stockpiles should be securely fenced to prevent wildlife accessing them. Materials should not be stored on or near the root protection area of trees as soil compaction can damage tree health. Excavations should be left covered overnight or provided with a means of escape for wildlife. Water butts should be left covered over night to prevent wildlife drowning while attempting to drink.

Prior to the start of works on site the contractor should receive a 'toolbox' talk to describe the ecological features and species present, their legal protection and responsibilities towards them and what to do if wildlife is encountered. Relevant material should be included in the induction material for new site personnel.

6. Conclusion

The proposed development site comprising four / five large fields to the east of West Horndon was surveyed and assessed for ecological interest in 2014. The desktop assessment identified that the site does not include and is not close to any nearby protected or sensitive sites and that it does not have any previous protected species records.

The survey identified that the majority of the site (cultivated land, improved grassland and ruderal habitats) is of low ecological value but contains ditches, hedgerows and mature trees which are of greater potential value. One protected species, barn owl was recorded together with some potential bat habitat.

Further surveys are recommended for bats and barn owls, with precautionary measures for the prevention and avoidance of harm to other wildlife are described. Recommendations are also made for the retention, management and enhancement of habitats.

As the majority of the site is of low ecological value, there should be no reason (with respect to ecological issues), once a reasonable and proportionate further survey effort is completed and details of appropriate mitigation provided, that a local planning authority should not grant planning permission for a proposed development of new houses and associated infrastructure.

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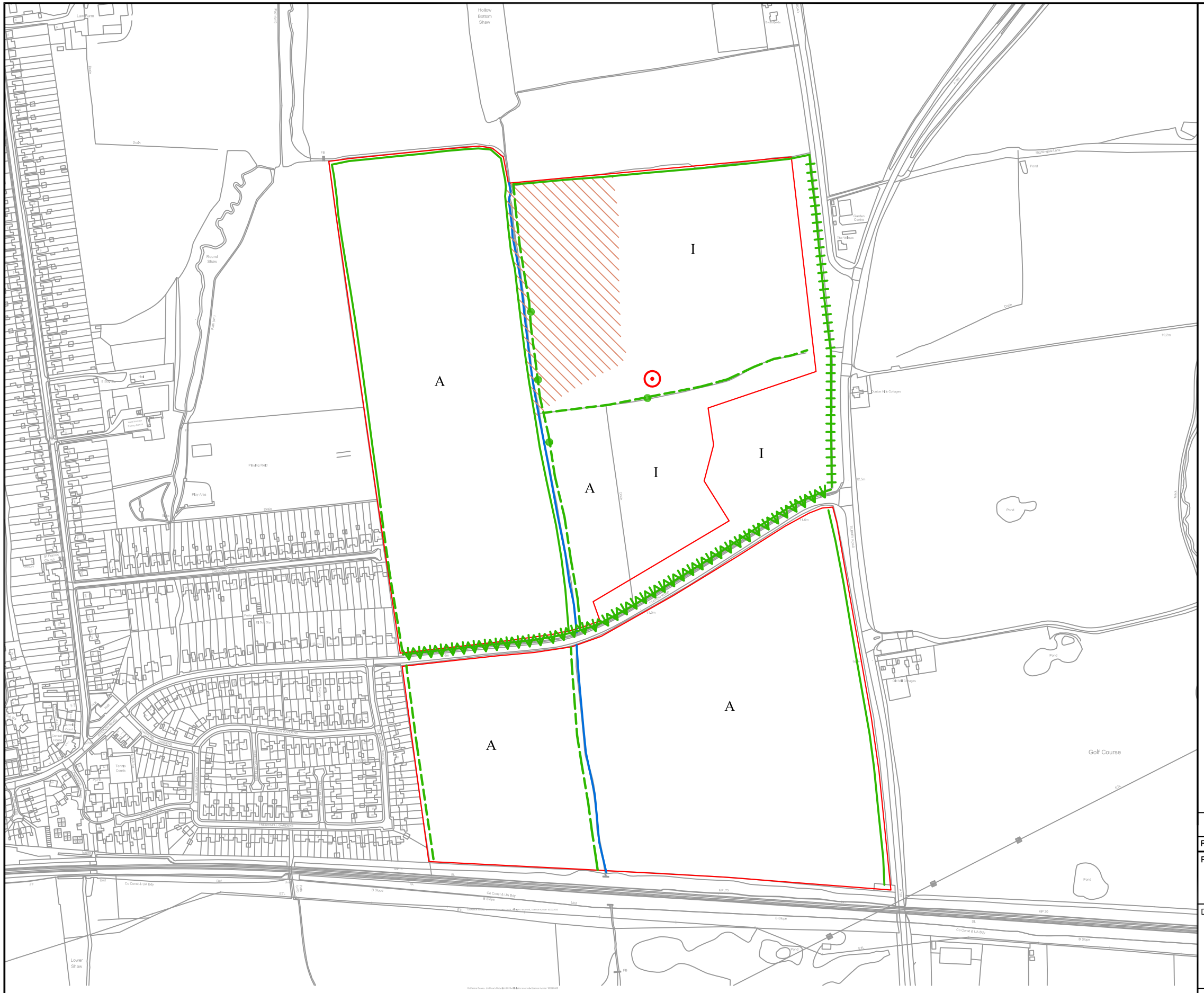
8. Appendices

Appendix A - Phase 1 Survey Plan

Figure 3 – Phase 1 Survey Plan

Appendix C – Desktop Study Results

Essex Field Club Report



Legend

- A3.1 Broadleaved parkland/scattered trees
- B4 Improved grassland
- C3.1 Other tall herb and fern - ruderal
- G1 Standing water
- G2 Running water
- J1.1 Cultivated/disturbed land - arable
- J2.1.2 Intact hedge - species-poor
- J2.2.2 Defunct hedge - species-poor
- J2.3.1 Hedge with trees - native species-rich
- J2.3.2 Hedge with trees - species-poor
- J2.4 Fence
- Target note

Rev	Revision Date	Purpose of revision	Drawn	Check'd	App'd
0	07/11/14	First issue	JMG	RG	RG

Project

West Horndon

Drawing title

Phase 1 Habitat Survey

Scale	1:5000 @ A3	Do not scale

Drawing number: 14/WHOR/01

Rev: 0

A3

LAND AT WEST HORNDON, BRENTWOOD

Draft Local Plan Representations

Report No. 13-158-15
March 2016

LAND AT WEST HORNDON, BRENTWOOD

Draft Local Plan Representations

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DOCUMENT CONTROL SHEET

REV	ISSUE PURPOSE	AUTHOR	CHECKED	REVIEWED	APPROVED	DATE
	Draft	SRD	ACM	ACM	ACM	Mar '16
A	Final draft	SRD	ACM	ACM	ACM	Mar '16

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APPENDICES

1.0 INTRODUCTION

Background

1.1 Odyssey Markides (OM) has been appointed by Countryside to provide transport advice relating to a site at West Horndon in Essex. The site is located within the Borough of Brentwood, adjacent to Basildon Borough.

1.2 Brentwood Borough Council (BrBC) are currently in the process of preparing their Local Plan, and have recently published an initial draft Local Plan (LP) document. The consultation period opened on 10 February 2016 and will close on 23 March 2016.

1.3 Simultaneously, Basildon Borough Council (BaBC) have also published an initial draft of their LP. The BaBC consultation period will close on 24 March 2016.

1.4 The purpose of this report is to represent the views of Countryside on the suitability of the site to be included in the BrBC LP with regards to transport.

Approach

1.5 **Section 2.0** of this report summarises the approach and contents as well as evidence for the BrBC LP document, setting out the relevant policies. It further sets out OM's/ Countryside's view of the proposed policies and strategic site allocations.

1.6 **Section 4.0** contains a summary and conclusions.

2.0 BRENTWOOD BOROUGH COUNCIL INITIAL DRAFT LOCAL PLAN

Introduction

2.1 Following BrBC's consultation on their Strategic Growth Options in January and February 2015, during which OM also represented Countryside's view, BrBC have now published the initial LP document along with its evidence base to date. The consultation period runs from 10 February 2016 to 23 March 2016.

2.2 For the purpose of the Strategic Growth Options Consultation in 2015, BrBC had divided the borough into three areas. These were:

- North of the Borough
- A12 Corridor
- A127 Corridor

2.3 At that time, in 2015, four strategic growth options were considered, along with a fifth option for a number of smaller sites. The strategic sites were:

- Option 1: Dunton (west of Laindon)
- Option 2: West Horndon
- Option 3: South-east of Brentwood / Shenfield
- Option 4: Pilgrims Hatch

2.4 For the purpose of the most recent consultations, BrBC have decided to split the borough into four areas, which are:

- Rural North
- A12 Corridor
- Rural South
- A127 Corridor

2.5 The draft LP consulted on at the moment contains, at Policy 5.2, the housing growth, based on the Council's Strategic Housing Market Assessment (SHMA). This suggests that provision is to be made for 7,240 new residential

dwellings (net) during the plan period of 2013-2033, averaging 362 dwellings per year.

2.6 Some of this has already been completed or granted planning permission, and the proposed or anticipated breakdown set out in Policy 5.2 is summarised in **Table 2.1** of this report.

Table 2.1 – Housing Growth during plan period 2013-2033 (source: BrBC initial draft LP February 2016)

	Net Homes	**%**
Completion 2013/14 & 2014/15	383	4%
Extant permissions (April 2015)	444	6%
Permitted development (April 2015)	300	4%
Urban areas (brownfield)	1,296	18%
Brownfield Land in Green Belt	97	1%
Strategic Site	2,500	35%
Greenfield urban extensions in Green Belt	1,292	18%
Windfall allowance	928	14%
Total	**7,240**	**100%**

Sustainability Appraisal

2.7 The initial draft LP is supported by a Sustainability Appraisal (SA), also dated February 2016. This sets out at paragraph 6.3.9 the potential options for the strategic site allocation. For the purpose of the latest draft LP the council identified six options for strategic growth:

- Option 1: 1,420 homes at land to the north of Brentwood
- Option 2: 2,500 homes at Dunton Hills Garden Village
- Option 3: 2,500 homes through an extension of West Horndon
- Option 4: 2,500 homes at land to the East of Running Waters, Hutton
- Option 5: 3,200 homes at Dunton Hill Garden Village and land north of Brentwood
- Option 6: 3,200 homes through an extension of West Horndon and land north of Brentwood.

2.8 In Table 7.2 of the SA, a summary of the appraisal of each option against each of the topics that comprise the SA framework is set out. At the bottom of Table 7.2, the SA states :

The primary conclusion to draw from the table is that, in terms of the majority of objectives, a strategic allocation at one or either of the A127 locations (West Horndon or Dunton Hills Garden Village) is to be supported. 'Biodiversity' objectives are a notable exception, although the appraisal is fairly marginal, i.e. it is not clear that there are major constraints to growth south of the A127.

2.9 It is clear that, based on the SA, the preferred options for strategic housing sites are those along the A127 corridor, i.e. Dunton Hills Garden Village or West Horndon.

2.10 However, the topics against which the SA has been undertaken do not include transport by all modes. This is a major factor contributing to the sustainability of any development, and hence the SA is fundamentally flawed due to the lack of consideration for transport as a topic. The Transport topic should include the assessment of links to public transport and in particular local railway stations; it should further consider travel by all modes, including walking, cycling, public transport as well as vehicles.

Highway Modelling

2.11 In addition to and informing the SA, the draft LP is supported by other assessments; most relevant for the purpose of these representations is the Peter Brett Associates (PBA) report entitled Development Options – Highway Modelling, dated February 2016.

2.12 The PBA report was prepared only shortly before its publication and it acknowledges that it has not yet been fully reviewed by the highways authority, Essex County Council (ECC), and Highways England (HE).

2.13 The PBA report contains the highway assessments of a number of junctions within Brentwood Borough. Four development options have been modelled; these correspond to Options 1 to 4 of the SA, albeit in a different order.

2.14 In te PBA report, the Dunton Hills Garden Village strategic site is referred to as Option 1 whilst the West Horndon strategic site is referred to as Option 2.

2.15 The highway modelling has been undertaken on the basis of the estimated trip generation for each development option, in addition to the background traffic which is based on surveys carried out in 2012.

2.16 The trip generation of the potential residential and employment developments has been estimated from first principles; that is using population data in combination with the National Travel Survey (NTS) to calculate the number of person trips. These were distributed using a combination of Census data and a gravity model, and a likely mode share was applied.

2.17 The model covers Brentwood District and within this a number of junctions which have been assessed using industry standard software.

2.18 It is not clear from the PBA report on what basis the mode share was obtained, in particular for those journeys that are made by two modes, e.g. car and train. Furthermore it is not obvious if an allowance has been made for potential developments in neighbouring authorities, beyond a general growth factor.

2.19 In October 2014, Essex CC provided comments on the proposed methodology for the trip generation, and these comments, together with PBA's response are included in Appendix A of the latest modelling document.

2.20 It is not clear, however, if those comments have all been taken on board for the latest assessments. For example, ECC comments make reference to Section 2.3.3 "Identifying Residential Population Figures", and PBA have agreed to change the methodology. We cannot be certain from the documents submitted that these changes are reflected in the latest document.

2.21 There are a number of other shortcomings within the PBA report which puts doubt on the validity of the contents. This includes a lack of transparency about the assumed access points to the strategic sites and the apparent use of a static assignment in the Omnitrans traffic model. Furthermore, the model omits local junctions which are located in Basildon, which will be significantly affected by the strategic sites.

2.22 Importantly, the junction assessment results presented in Tables 11-1 and 11-2 of the PBA report suggest that the difference in performance between the Dunton Hills Garden village and the West Horndon site is minimal, and yet in paragraph 11.2.3 the author concludes that "it appears that Option 1 and 4 have resulted in lower RFC / Degree of Saturation in general when compared to the other two options."

2.23 We consider this conclusion to be both misleading and unfounded. The work as presented in the draft PBA report lacks depth and serious technical analysis. No real conclusions on the four options can be drawn from it. A more detailed critique of that work is attached as Appendix A but we suggest that more needs to be done in terms of highway modelling to determine the real impact of the four options on the local highway network.

Initial Draft Local Plan document

Policy 5.1 Spatial strategy

2.24 Policy 5.1 of the draft LP sets out the spatial strategy for the borough: "*The Borough's distinct local character will be protected and enhanced while we foster sustainable communities by focussing new development on land within the Borough's Transport Corridors. … All development sites will be identified having regard to whether they a. are accessible to public transport, services and facilities, b. will have no significant impact on the Green Belt, visual amenity, heritage, transport and environmental quality including landscape, wildlife, flood-risk, air and water pollution; and c. are likely to come forward over the Plan period.*"

2.25 This is then followed by paragraph 5.20, which states "*Within the A127 Corridor, a new strategic allocation at Dunton Hills Garden Village will provide a*

new mixed use self-sustaining community in the south-east of the Borough. … Brownfield opportunities will be taken to effectively meet local needs, such as residential-led mixed-use redevelopment of existing industrial land in West Horndon, creating a new village centre with supporting services and facilities closer to the village rail station. …Significant improvements to infrastructure will be required to support growth within the A127 Corridor."

2.26 An attempt has been made in paragraphs 5.31 and 5.32 to justify BrBC's decision to choose the Dunton Garden Hill Village over the West Horndon sites as the strategic housing site: "*Larger villages in the Borough are served by a local shopping parade and a primary school. They generally have limited community and health facilities, local jobs and a variable bus service. As well as these facilities, West Horndon has a rail station and a large brownfield redevelopment opportunity using the existing employment areas. Among the Borough's villages it offers the most scope for development, although it will be important to retain the settlement as a village and not over-develop in order to be consistent with the proposed spatial strategy*."

2.27 Indeed, West Horndon is the only settlement within the A127 Corridor in Brentwood Borough which benefits from a rail station, making it the most sustainable location along the A127 Corridor within Brentwood. Borough.

2.28 On that basis and in light of Policy 5.1 we consider West Horndon as a location for strategic residential development particularly suited, due to the railway station. Given the location of the railway station in relation to the potential development sites, the vast majority of the West Horndon settlement, including the strategic site, will be within walking distance of the railway station and all of West Horndon will be within easy cycling distance.

2.29 The nearest railway station to Dunton Hills Garden Village location is also West Horndon, however it is not what is typically considered within easy walking distance. It is therefore likely that the majority of train users from the potential Dunton Hills Garden Village will choose to drive to a railway station, either West Horndon, Laindon or Basildon, putting additional pressure on the highway network and station car parks.

2.30 Furthermore, it should be borne in mind that part of the potential strategic site allocation includes land to the south of the railway which would enable significant improvements to the station access, including access by bus, making a strategic allocation at West Horndon the most cost-effective and sustainable location.

2.31 The notion of locating new development near railway stations is also reflected in the proposed changes to NPPF. At paragraph 14 this states "There are significant benefits to encouraging development around new and existing commuter hubs - reducing travel distances by private transport, making effective use of private and public sector land in sustainable locations, and helping to secure the wider regeneration and growth of the local area. In this context, we are keen to support higher density housing development around commuter hubs to help meet a range of housing needs including those of young first-time buyers."

2.32 The proposed changes to the NPPF document goes on to say at paragraph 15 "We are proposing a change to national planning policy that would expect local planning authorities, in both plan-making and in taking planning decisions, to require higher density development around commuter hubs wherever feasible.

2.33 The OM assessment further suggests that a strategic site allocation at West Horndon would increase the rail user demand at the station to a level which is commercially viable for the train operator. We therefore consider it appropriate to class West Horndon station as a potential commuter hub in line with the proposed changes to the NPPF.

Policy 6.1 Sustainable Development

2.34 The draft LP recognises the importance of sustainable development, and this is set out in Policy 6.1: "*When considering development proposals, the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework….*"

2.35 We agree with this policy, which confirms compliance with the principles set out in national policy.

Policy 6.3 General Development criteria and Policy 6.4 Effective Site Planning

2.36 Policy 6.3 then sets out general development criteria:

"*Proposals for development will be expected to meet all of the following criteria:.*

a. …;

b. provide satisfactory means of access to the site for vehicles, cyclists and pedestrians and parking and servicing arrangements;

c. ensure the transport network can satisfactorily accommodate the travel demand generated and traffic generation would not give rise to adverse highway conditions or highway safety concerns or unacceptable loss of amenity by reason of number or size of vehicles; …

2.37 This is then expanded on in Policy 6.4 : "*Development will be favourably considered where the planning and design of buildings and spaces: a. arrange access points, routes within the site … in an efficient, safe, workable, spatially coherent and attractive manner; …*"

2.38 The Dunton Hills Garden Village site is bordered by the A127 to the north, by the A128 to the west, by the railway line to the south and by fields to the east, which are located within Basildon Borough.

2.39 The fields to the east of the site are in part proposed for residential development in the Basildon Local Plan, however following the Dunton Garden Suburb consultation in early 2015 it is now unlikely that the whole of the Dunton site (Brentwood and Basildon Boroughs) can be delivered jointly by the two Borough Councils.

2.40 It is therefore important that the Dunton Hills Garden Village site is accessible on its own, without relying on the Basildon site to come forward at the same time.

2.41 Given the proposed quantum of development, 2,500 dwellings plus employment schools, retail and ancillary facilities, at least 3-4 access points will be required to serve the development safely. Although without detailed development proposals it is difficult to estimate the likely trip generation, we anticipate that the residential element alone would generate in the order of 1,500 vehicle movement in the peak hour. Trips generated by the employment element as well as schools and ancillary facilities would be additional to this.

2.42 Given the location of the site and the surrounding area, the only potential access options for the Dunton Hills Garden Village site within Brentwood are therefore off the A127 or off the A128.

2.43 The potential for a new access junction onto the A127 has been explored and it has been concluded that it is not possible to provide safe access to the Dunton Garden Suburb via a new grade separated junction onto the A127 due to junction spacing constraints.

2.44 Therefore the only access option within Brentwood is off the A128. The A128 is a single carriageway and is subject to a 50mph speed limit in the West Horndon and Dunton area. It mainly carries through traffic and provides access to the A127 to the north and the A13 to the south..

2.45 Whilst there appears to be potential for one or two accesses to be provided off the A128, it is unlikely that the required number of accesses (three or more) can be provided off this road.

2.46 Furthermore, the western part of the Dunton Hills Garden Village site is affected by flooding and parts of it are in Flood Zone 3. For this reason, the original Dunton Garden Suburb proposals contained the recreational areas (open spaces etc) within the western part whilst the residential areas and other facilities were located in the eastern part of the site. We anticipate

that this would again be the case for any Dunton Hills Garden Village proposals.

2.47 Providing an access road through flood zones 2 or 3 is costly both in terms of construction and maintenance, and hence it does not usually provide a viable access strategy.

2.48 Additionally, even if one or several access roads, were to be provided through the flood zone, these would most likely be long straight roads through recreational space, thereby impacting on users of the recreational space as well as wildlife. The roads would be conducive to speeding thereby not creating a safe means of access.

2.49 We therefore do not consider that a suitable and safe vehicular access strategy can be achieved with accesses from the A128 alone. If such an access could be engineered, we expect that it would be both costly and environmentally undesirable.

2.50 We now consider the possibility of an access to the east, in Basildon District. West Mayne for the majority of its length is a single carriageway road, providing access to the residential areas of Laindon, Langdon Hills and beyond. It therefore already serves a number of existing areas with several access junctions along it. These local access junctions and the areas they serves would all be impacted on by a new access to serve the Dunton Hills Garden Village.

2.51 To the north, West Mayne provides access to the Dunton roundabout. This junction is already at capacity and with the addition of 2,500 homes, and potential in excess of this if the Basildon site comes forward, both the Dunton roundabout and West Mayne itself will operate above capacity.

2.52 We therefore consider that the Dunton Hills Garden Village site cannot be accessed in a suitable and safe way and so the Dunton Hills Garden Village proposal is contrary to policies 6.3 and 6.4 of the draft LP.

Policy 6.5 Key Gateways

2.53 In Policy 6.5, the importance of Key Gateways into the Borough is highlighted; with regard to rail station the policy states: "*Locations around rail stations should contribute to these aims through the delivery of higher density development to meet local needs in central sustainable locations. ….*"

2.54 West Horndon is clearly one of the Key gateways into the Borough, with the only railway station in Brentwood Borough along the London Fenchurch Street to Shoeburyness line.

Policy 6.6 Strategic Sites

2.55 The proposed strategic site allocations are set out in Policy 6.6, including the strategic residential site at Dunton Hills Garden Village.

2.56 In paragraph 6.32, the reason for removing the West Horndon sites from the strategic area for growth is explained: "*West Horndon village has been removed as a strategic area for growth in order to protect its village character. Instead, redevelopment of the existing industrial estate (brownfield) alone will bring forward sustainable development near to the rail station with new homes and supporting facilities, creating a new village centre at the heart of the community while maintaining the village boundary. Redevelopment of the industrial estate sites is now covered in Policy 7.4, and is consistent with the spatial strategy*."

2.57 Given all of the above we consider the proposals for the strategic site at Dunton Hills Garden Village set out in policy 6.6 to be contrary to policies 5.1, 6.1, 6.3 and 6.4 of the draft LP, whilst the West Horndon strategic allocation sites are all compliant in these policies, as has been shown above.

Policy 7.1 Dunton Hills Garden Village

2.58 In Policy 7.1, details of the Dunton Hills Garden Village are then set out, although this is followed by paragraph 7.10, which states that "*land around West Horndon village remains a reasonable alternative because it can provide for similar development numbers towards local needs. However, it has not been selected as a preferred site in this Draft Plan owing to the impacts on the existing village, which*

would not be consistent with the emerging spatial strategy. It has also been considered that proposed redevelopment within West Horndon village will bring forward significant residential development, altering the character of the village but utilising brownfield land. Further development of Green Belt surrounding West Horndon is deemed disproportionate when considering the size of the existing village and how this fits with the spatial strategy for our Borough of villages."

2.59 Whilst it is acknowledged that West Horndon is a village and that a strategic allocation would result in a large increase in population, it is the only settlement in Brentwood Borough with a railway station along the Fenchurch Street to Shoeburyness railway line. Given the national policy (NPPF) which requires new development to be located in sustainable locations near transport hubs where possible, this is considered to override any potential spatial strategy referred to within the LP.

Policy 10.1 Sustainable Transport

2.60 In Chapter 10 of the draft LP policies regarding Quality of life and Community Infrastructure are set out. Specifically, Policy 10.1 sets out the proposed approach to sustainable transport. It states that "*where travel is necessary public transport (rail, bus, taxi), walking and cycling will be promoted as an alternative means of transport to the private car*."

2.61 Whilst public transport, walking and cycling are all considered sustainable modes of travel, it is generally accepted that walking and cycling are those that generate no greenhouse gases and do not add to existing or future congestion and hence are the most sustainable modes.

2.62 A potential site allocation at the Dunton Hills Garden Village would result in a significant number of car driver trips to local railway stations and in the requirement for an additional bus service to provide a connection to nearby railway stations due to the distance from existing railway stations.

2.63 A strategic allocation at West Horndon however would enable the majority of those who travel by train to walk or cycle to the station and so use the most sustainable form of transport.

Lower Thames Crossing

2.64 HE are currently consulting on four options for a new river crossing. Route 4 of these options runs from Tilbury / East Tilbury to the south (north of the river) towards the A13 and the runs to the east of and almost parallel to the A128.

2.65 If this option were to be delivered by HE, this would severely impact on the Dunton Hills Garden Village site, both in terms of community severance and traffic noise.

3.0 **SUMMARY AND CONCLUSION**

3.1 We have assessed the proposed strategic allocation of the Dunton Hills Garden Village site against the transport related policies of the draft LP.

3.2 We have shown that the Dunton Hills Garden Village allocation would be contrary to a number of policies in the draft LP as well as national policy (NPPF).

3.3 Furthermore, it would be difficult to deliver a safe and suitable access strategy due to the constraints at the Dunton Hills Garden Village site. Any access constructed through the flood plain would be both costly and environmentally undesirable whilst an access to the east, via West Mayne would lead to significant capacity issues on local roads.

3.4 We have reviewed the PBA report, which seeks to provide a highway modelling analysis. However, we have found it to be a superficial analysis which provides no clear conclusion and cannot be relied upon.

3.5 We have further shown that a potential strategic allocation at West Horndon would provide a solution that is both in accordance with the LP policies as well as national policy. This could include improvements to West Horndon station which would also benefit existing residents and rail users.

3.6 We have therefore demonstrated that a strategic allocation at West Horndon would provide a more sustainable development with a suitable access strategy than the Dunton Hills Garden Village could provide.

APPENDIX A

Review of PBA Strategic Development Modelling Report for BBC

ODYSSEY MARKIDES LLP

TECHNICAL NOTE

PROJECT	**:**	**Development at West Horndon**
JOB NO	**:**	**13-158**
NOTE TITLE	**:**	**Review of PBA Strategic Development Modelling Report for Brentwood Borough Council**
AUTHOR	**:**	**TDM**
APPROVED	**:**	**AM**
DATE	**:**	**March 2016**

1.0 INTRODUCTION

1.1 Odyssey Markides (OM) LLP have prepared this note in order to provide Countryside Properties with feedback regarding a Modelling Note prepared by Peter Brett Associates (PBA) for Brentwood Borough Council. The note by PBA set out the results of a high level traffic impact assessment of four strategic development sites (**Figure 1** refers) in the Brentwood area.

1.2 The four sites considered are as follows:

- Option 1 - Dunton Hills Garden Village - 2500 Dwellings;
- Option 2 - West Horndon Extension - 2500 Dwellings;
- Option 3 - North of Brentwood – 1169 Dwellings;
- Option 4 - Land East of Running Waters Brentwood – 1000 Dwellings

1.3 The report focused on the impact of the four options on the Brentwood Borough and therefore the assessment scope is limited in terms of the wider impacts upon the highway network.

2.0 SHORTCOMINGS OF PBA ASSESSMENT

2.1 Having reviewed the PBA assessment report, there are concerns regarding the assessment methodology and conclusions drawn from the assessment. The main shortcomings identified include:

- The assessment takes no account of existing and proposed major development proposals (as well as infrastructure), which are located to the east and south; for example there is a major employment site at DP World Gateway Logistics Park near Corringham, a proposed theme park at Gravesend, the Thames Link improvement scheme and other attractors located in the adjacent Basildon district. None of these have been factored in the PBA assessment.

- The assessment software used OMNITRANS, is '*not a true strategic modelling tool*' in the sense that, while it is able to assign traffic to the shortest journey (in terms of distance), this can result in convoluted routes which in reality are unlikely to be taken by development traffic.

- The modelling software does not take into account congestion at junctions which would then result in drivers choosing alternative routes;

- The junctions selected for testing were chosen by the local authority, however the study area only considered junctions within the Borough of Brentwood. It therefore under represents other nearby highway networks outside of Brentwood's jurisdiction (i.e. A127 / B148) as well as trunk roads (Highways England) to the east.

- The analysis carried out is superficial as it fails to investigate the significance of the impact (and/or remedial works) of one junction against another.

- The assessment results provide a strategic overview of total development impact within Brentwood, however Countryside's site at West Horndon is for 650 dwellings, not 2500 as has been modelled. The impacts assessed are therefore non-comparable.

3.0 PBA REPORT REVIEW

Assessment Results

3.1 The results presented in the PBA report are of a generic and superficial nature. This makes them unsuitable for drawing any conclusions from, relating to the four residential allocation options. It is impossible to determine from the work carried out if:

- The impact of each option at each junction is significant,
- The impact can be ameliorated: and
- Each junction is more important than another.

3.2 In addition, some of the assessment results appear to be incorrect. For example the link flow development traffic distribution diagrams indicate that approximately a third of traffic from Option 2 (West Horndon extension) will distribute onto the network via the country lanes to the west, whereas 95% of development traffic for Option 1 is distributed north to the A127 / A128 junction. Yet the capacity results suggest Option 2 has a bigger impact on the A127 / A128 junction, despite having significantly less traffic assigned to the junction.

3.3 These inconsistencies make the analysis unreliable, and therefore they cast doubt on the conclusions presented.

Mitigation Recommendations

3.4 The report arbitrarily selects the top 10 '*worst performing*' junctions (excluding junctions with the M25) and recommends these for improvement in order to mitigate development impact.

3.5 This conclusion is misleading as it implies that the 'worst' performing junctions do so as a direct result of development impact when in fact a number of the junctions assessed are already operating very close to or above maximum capacity. The addition of development traffic in some locations would be relatively minor in terms of additional traffic throughput; however the impact is presented as severe in the PBA report.

3.6 One such example of this is Junction 16, the A128 Brentwood Road / Running Waters double mini-roundabout. This junction is listed as the worst performing junction under all four options. However it already operates at an RFC of 1.79 in the baseline

scenario. While this junction would benefit from improvement the report is incorrect to suggest that the impact of the development traffic in itself, would necessitate any improvement measures.

Overall Comment

3.7 Notwithstanding the shortcomings of the PBA assessment it is clear from the language used in the report that the author is not confident about the depth of the work carried out and/or the conclusions reached.

3.8 For example, the report states that it only 'appears' Options 1 and 4 have the least impact upon the junctions assessed. There is little confidence in this statement and in fact, reviewing the summary tables it is clear that there is very little variation in impact across all four development sites.

3.9 In fact looking at the summary tables in detail, the results show that Option 2 (West Horndon) has less of an impact than Option 1 (Dunton Village), with junctions 2, 10,13,15,17,19,20,21, and 23 actually resulting in better impact results than Option 1. Therefore PBA's statement that Option 1 and 4 result in less impact than Options 2 and 3 is also incorrect.

4.0 CONCLUSION

4.1 Having reviewed the PBA Strategic Development Impact Overview, it is clear that there are fundamental issues with the depth of the work carried out, the data presented; and conclusions drawn from that data.

4.2 It is also important to note that the scale of strategic development assumed in the assessment for West Horndon is significantly larger than the site being promoted by Countryside (650 dwellings vs 2500 dwellings). Therefore the conclusions presented in the PBA report are not applicable to this scheme as they are not comparing site for site.

4.3 In conclusion Odyssey Markides would suggest that the PBA report cannot be relied upon to draw any meaningful conclusions about the suitability or otherwise of the four options.

4.4 We would highly recommend that a more thorough assessment be undertaken in order to enable a decision to be made, based upon undisputed technical analysis and evidence.